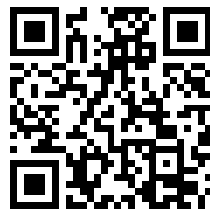

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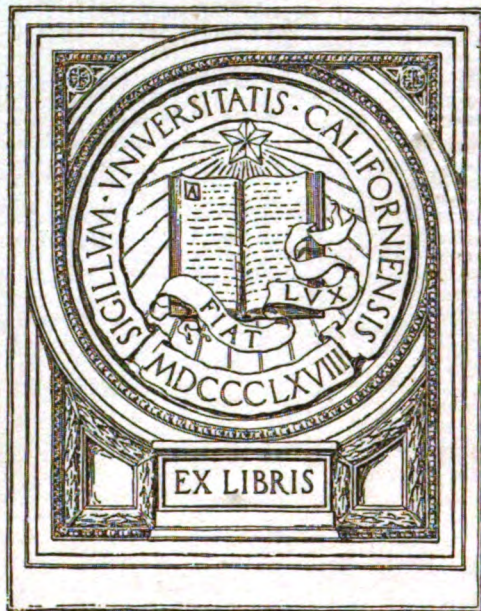
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OF THE

Royal Army Medical Corps

EDITED BY

COLONEL SIR WILLIAM H. HORROCKS, K.C.M.G., C.B.

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Journal

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OF

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Medical Corps

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MONTHLY

EDITOR.

COLONEL SIR WILLIAM H. HORROCKS, K.C.M.G., C.B.

ASSISTANT EDITOR.

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Journal of the Royal Army Medical Corps.

Original Communications.

“KHURDISTAN,” 1923.¹

By KOICOL.

I.

OUR unsettled relations with Turkey in the latter part of 1922 were seriously reflected in Khurdistan, that wild, almost impenetrable borderland separating Turkey and Persia from Northern Iraq.

The Turks had been concentrating troops for several months on their frontier, about 90 miles north of Mosul; they had been in occupation since 1919 of Rowanduz, the frontier town about 100 miles north-east of Mosul through which the one and only trade route from Turkey and Persia passes to this part of Khurdistan. A small column of Indian troops and levies had suffered a reverse at Rania, a Khurdish town south of Rowanduz in August, and this was followed by our evacuation of Sulimania (about 150 miles south-east of Mosul) and the surrounding district.

The consequence was that Turkish prestige was very high and anti-British propaganda was spreading among the Khurds.

To counteract these evil influences a concentration of troops and Royal Air Force was ordered at Mosul in January, 1923. This force was very actively manœuvred, and its presence there soon stopped any idea of a Turkish attack on Mosul from the north and counteracted the effect of Turkish propaganda in the immediate vicinity.

¹ In preparing this article, the writer has freely used the official reports and dispatch. The photographs were taken by officers who served with Koicol and who have kindly given permission for their publication.

In February it was discovered that the Governor of Sulimania, one Sheikh Mahmoud, was intriguing with the Turkish Commander to bring about a general rising in Khurdistan and was in communication with the Shiah Divines in the Holy Cities, to cause a general insurrection in Iraq. Sheikh Mahmoud is a most influential personality in Southern Khurdistan; he is a clever but fanatical and treacherous leader who was reinstated Governor of Sulimania by the High Commissioner after our evacuation, but was soon plotting with the Turks against British authority.

In order to restore the situation and evict the Turkish element, two columns were mobilized from the troops in Mosul, in March, 1923.

(1) A Levy column called "Frontiercol" under the command of Colonel Commandant Dobbin, D.S.O., consisting of: 3 infantry battalions, 1 section pack battery, and 1 machine gun company, all Assyrian levies, directed on Rowanduz.

(2) An Imperial column called "Koicol," under the command of Colonel Commandant Vincent, C.B., C.M.G., consisting of: 2 British battalions, 1 Indian battalion, 1 Indian pack battery, 1 company sappers and miners, 2 sections of a combined field ambulance, Indian mobile veterinary section and train, directed on Koi Sanjak.

In addition to the field medical unit, a motor ambulance convoy (10th M.A.C.) of 28 Ford motor ambulance cars with two motor launches was mobilized, and the existing hospitals at Shergat and Mosul were prepared to receive patients from the columns, while a hospital train at Shergat (Rail Head) was ready to convey them to Baghdad. The R.A.F. also promised to assist in the evacuation of casualties by air.

Air Forces for these columns were based on Mosul, Erbil and Kirkuk.

This article is the medical history of Koicol.

Before leaving Mosul the troops were medically examined, and only those men considered physically fit for active service were permitted to accompany the column. In this connexion it is interesting to note that one British battalion had only just arrived from India (Quetta); the other, although it had only been in Iraq a couple of months, had been undergoing intensive training at Baghdad and Mosul, while the Indian battalion, after three years' strenuous field service in Iraq, had become hardened veterans.

The wild and mountainous nature of the country through which the columns were about to operate rendered the use of wheeled transport impossible after the earlier marches, and necessitated the distribution of the field ambulance equipment into loads suitable for pack transport. This was a task of considerable difficulty owing to the awkward nature and bulkiness of some of the material such as stretchers, distinguishing flag poles, nests of closet stools, etc., but after a good deal of experimenting and casting of non-essential equipment, a more or less satisfactory "Pack Field Ambulance" was improvised. At the same time, in anticipation of the difficulties of a regular supply of medical requirements, extra panniers of

specially selected drugs and vaccines were included. There was so little time and all the troops were so busy preparing for the operations, that it was not possible to carry out anti-enteric inoculation before leaving Mosul, but a large majority of all ranks had recently been so protected.

The troops crossed the Tigris at Mosul and concentrated at Nineveh on March 16, 1923. Unfortunately, heavy rain fell all through the night, making the roads in such a bad condition that it was impossible to march on the following day. After two trying marches through heavy mud the Greater Zab River was reached at Kuweir on March 21. During these marches a number of men from the newly-arrived battalion fell out

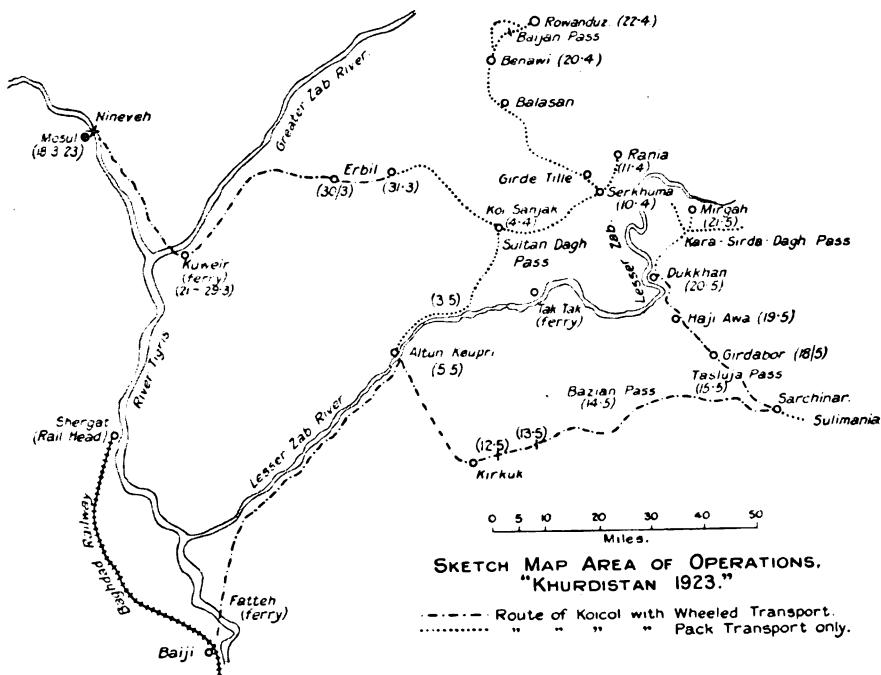


FIG. 1.

suffering chiefly from sore feet, those who were too bad to continue the march were evacuated to Mosul by cars of the motor ambulance convoy. The river was found to be in heavy flood and had to be crossed in boats and barges, the wagons being carried on rafts or pontoon boats. Each barge could carry about twenty-five men or four mules and eight men, and took ten minutes to cross, with the current, and forty minutes to return, against it.

The two motor launches were sent from Mosul to assist in transporting troops and carrying sick across the river. The passage was not unattended with danger, and two Sepoys of the sappers and miners were, unfortunately, swept down the river by the current and drowned. The column

occupied seven days in crossing to the left (eastern) bank. Five horsed ambulance wagons now joined the column with the wheeled section of the train and a specially qualified and experienced R.A.M.C. serjeant was sent from Mosul to assist in the supervision of the chlorination of water when necessary, and the general sanitation of the camps.

Koicol marched from Kuweir on March 29, reaching Erbil on the following day. A section of eight motor ambulances accompanied the troops, and a rest station, with a similar number of cars and the two launches, remained at Kuweir under the O.C. 10th Motor Ambulance Convoy.

Erbil, the ancient Arbela, situated on the summit of a great mound, formed of the debris of numerous dead cities of the past, standing out



FIG. 2.—Crossing Zab River, March 21-29.

prominently above the limitless plain, is surely one of the most impressive as it is one of the oldest, of the inhabited towns of the world.

During this period, hot weather made the marches very trying, and it was noticed that considerable numbers of the newly arrived battalion were struggling along obviously in pain, though few actually fell out. At Erbil, therefore, a careful medical inspection of the feet of the battalion was held, and it was found that, not only were many men suffering from blisters and abrasions but a surprising proportion of them presented some deformity of the foot. Arrangements were made to evacuate the eleven worst cases and to carry sixteen others on the supply train wagons for the next day's march, after which a whole day's rest was promised. Special attention was now directed to the care of the feet, permanganate foot baths

were instituted in the British battalions and from this date a marked improvement was shown. Erbil being a Levy Station, a hospital existed there and the medical officer in charge undertook to accommodate sick from Koicol for a few days until the M.A.C. was able to evacuate them.

On the 31st, after an easy march of eight miles, a beautiful camp, on high ground, above a stream of purest mountain water, was reached, here the column halted forty-eight hours. The weather was fine, and fullest advantage was taken of the rest; the men bathed, washed their clothing, and "lay a-basking in the sun." Even an Easter day church service was held, but the padre wisely gave very short prayers and a still shorter sermon. Ten B.O.R.'s and four I.O.R.'s who were not well enough to ride with the column were sent back to Mosul.



FIG. 3.—Ambulance wagon crossing Zab River, March 21-29.

The transport and evacuation of sick from now onwards presented a problem of great difficulty. There were no lines of communication, so the sick, like the poor, were always with us; the limit to which any form of wheeled transport could be used had been reached and every march took the column further from its base. A convoy of local donkeys was provided for minor sick; lying cases could only be moved by hand carriage, and this, owing to the nature of the country, was a very slow and difficult task necessitating considerable discomfort to the patients; it was arranged that if it became necessary to use this method, local villagers would be commandeered, as they were accustomed to carrying loads among the mountain tracks. The only possible methods of evacuation from the

column were by air, whenever landing grounds could be found, and by rafts (killegs, willow poles covered with bundles of twigs and fixed on to inflated sheep and goat skins) when the column touched the Lesser Zab River.

The M.A.C. was now ordered to Altun Keupri on the Lesser Zab, to form a detention hospital and be ready to transport cases across the desert to the railway.

The next three days were occupied by one of the most trying marches imaginable. The route lay over rough mountain tracks and the rain

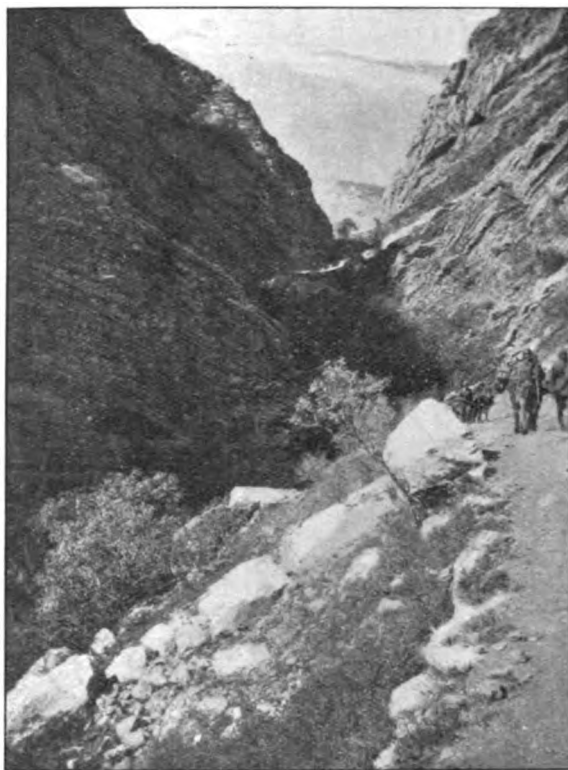


FIG. 4.—Road to Rowanduz Gorge.

frequently came down in torrents. The troops reached Koi Sanjak on April 4 in pouring wet, they were already soaked through and fatigued after their difficult march. The sodden condition of the ground rendered the use of canvas impossible, moreover as the second line transport now consisted entirely of pack camels which were travelling with great difficulty among the wet slippery rocks, it was impossible to say when the tents would arrive, if indeed they would arrive at all. Hence it was decided to billet the column. Suitable accommodation in such a town was necessarily very limited, but by utilizing the Fort (an old Turkish barracks),

a tobacco factory, the native school and the best of the Khurdish houses the men were provided with some sort of cover, and an issue of wood was made to enable them to dry their clothes. The next day, April 5, being fine and the transport having come in during the evening, the British battalion which occupied the closest billets, moved under canvas; unfortunately further rain prevented the other battalion from following them; by occupying the vacated quarters, however, they were less crowded.

As Koi Sanjak was to be the base of operations in the immediate future, the field ambulance opened at once in two large barrack rooms in the fort, and prepared to retain all cases, as in existing weather conditions any form of evacuation was impossible.



FIG. 5.—Gorge, N.E. Rowanduz.

A five days' halt at Koi was the first opportunity on which it was possible to reinoculate with T.A.B. vaccine all troops not so protected within twelve months. Sudden orders on April 8 to move on April 10 prevented the completion of the measure when rather more than half the column had been dealt with.

An outbreak of diarrhoea now occurred in the battalion which had recently arrived from Quetta.

On April 7, more than twenty men, all in one company, reported sick with this condition; the cases were mild in character, and the majority of them cleared up with simple treatment before the column moved.

On April 10, just before daybreak, the battalion in camp was fired upon, but no casualties occurred. The march was continued the same day to

Serkhuma, two platoons of Indian infantry and a tent subdivision of the field ambulance being left at Koi Sanjak.

The march to Serkhuma was about thirteen miles ; after fording the river outside Koi the road rises, gradually at first, over the Sultan Dagħ Pass (3,500 feet) ; it descends somewhat more steeply, crosses a spur and drops into the Rania and Serkhuma valley. The view from the top of the pass, over the valley and Rania foot hills to the great snow covered Persian mountains, is magnificent. On arrival at Serkhuma it was learnt that a party of Turks and Sulimania Levy deserters was passing through the Rania valley, some of them having spent the previous night in Rania village. As the enemy must have seen all our movements from the hills the column commander decided to attack the village at once and block



FIG. 6.—Sitting cases being carried on donkeys.

the exits from the valley. Two forces, each of one battalion, were detached from the column and marched during the night so as to reach their objectives at dawn, while the main body left Serkhuma for Rania at dawn.

The battalions were each accompanied by their regimental medical establishments and a modified bearer subdivision marched with the main body. On arrival of the main body at Rania, information was received that one battalion had been in action, and had with them three wounded. These were brought in by the regimental bearers to an advanced dressing station, formed at Rania ; later in the day, one British signaller, wounded in the ankle, was also brought in. The disposal of these cases was not easy, the marshy condition of the ground rendered the landing of aeroplanes

dangerous, and the only alternative was to man-handle the cases over the precipitous mountain path to Koi. A wireless message was sent to Air Headquarters, and in spite of the difficulties, a Vernon machine landed safely the next morning and took the patients direct from the advanced dressing station to the R.A.F. Hospital at Baghdad (about 220 miles) as the column left to return to Serkhuma.

In this action eleven of the enemy were reported to have been killed; the missing parts of two guns, lost in August, 1922, were recovered, with the exception of the breech block and dial sight which were afterwards found in Rowanduz. Rania and three adjacent hostile villages were destroyed.

Koicol remained at Serkhuma for five days, the weather continued to be unpropitious, constant rain converting the camps into a veritable quagmire. During this period, diarrhoea was again prevalent in one battalion, fresh cases occurring daily; they were still of a mild character, but when the column moved off on April 17 no less than fifty-eight men suffering from this condition were left behind, in the care of a tent subdivision of the field ambulance.

On April 13, a case of acute appendicitis was reported among the B.O.R.'s; owing to bad weather it was impossible for an aeroplane to land until the 16th, on which day the patient was sent by air to Mosul. Fortunately a localized abscess formed, this was opened immediately on arrival at hospital and the man made a complete recovery.

During this time Frontiercol had been marching north-east from Erbil, and there was evidence that the enemy intended to make resistance at a naturally very strong position on a ridge (Spilik Dag) which crossed the line of march to Rowanduz. It was decided that Koicol should make an outflanking march north-west, leaving a garrison at Serkhuma. This necessitated further division of the field ambulance. The second tent subdivision was left to look after the sick and the garrison, which included a number of B.O.R.'s who were not considered fit for the strenuous work ahead. The route lay through a narrow treacherous valley, the boggy nature of which, in places, greatly added to the danger from hostile rifles on the hills. On the first day's march (April 17), sniping began at about noon, luckily there were no casualties, and the enemy were soon dispersed by artillery fire. On the third day a more determined attempt to stop the column was made at the head of the valley, and on this occasion four men were wounded, and it was necessary to carry them on stretchers with the column to Benawi, up a rocky mountain track, rendered more difficult by violent hailstorms.

Military exigencies prevented the selection of a good camping ground at Benawi. The ground was strewn with boulders and sodden from constant rain. The water supply was limited and had to be carried a considerable distance from a mountain stream rendered muddy by continuous wet weather.

Orders were now issued for a force from Koicol to advance on Rowanduz

in conjunction with the Levy Column which had just arrived in the vicinity. Diarrhoea was still prevalent in one battalion, and twenty-nine of its men at Benawi were considered unfit to accompany this force. The battalion was now, as far as possible, isolated from the remainder of the column. No unusual number of intestinal cases had been reported among the other units.

A modified bearer subdivision followed the troops at 10.00 hours on April 22, and as no opposition was met, it was able to march right on to Rowanduz. This was the most difficult march the field ambulance had yet tackled. It entailed a very steep climb of 3,000 feet over the Bejan Pass, just above the snow line, and a precipitous descent to a rugged narrow gorge where the track continually crossed and recrossed a mountain stream swollen into a torrent by the melting snow. About half-way up the pass, two B.O.R.'s, each suffering from an acute paroxysm of malaria, one with a temperature of 104 degrees, were picked up and carried on donkeys for the remainder of the march; in such country no other means of transport would have been possible. In passing through the gorge, the rocky nature of the narrow track and the frequent sharp turns rendered the work of the pack animals extremely difficult. This was particularly noticeable in the case of the stretcher mules, which, on several occasions had to be unloaded, so delaying all the troops in rear; our present regulation stretcher is quite unsuitable for pack transport. After an exceptionally trying march, Rowanduz was reached at 19.30 hours, the sick were attended to and the ambulance settled down for the night.

It will be noticed that the field ambulance was now completely split up and covered an area of about fifty miles. The C.O. with one bearer subdivision was at Rowanduz, one bearer subdivision was at Benawi, one tent subdivision at Serkhuma, and the other at Koi Sanjak.

On the following day, which happily was bright and fine, the force halted at Rowanduz, giving the men a well-earned rest. The opportunity was taken to visit the Levy Column where it was learnt that Frontiercol had been practically free from sickness.

Frontiercol remained to occupy Rowanduz, and on April 24 the force from Koicol returned to Benawi by the longer but easier route through the Rowanduz Gorge; one battalion of levies was attached to do the picketing which was carried out by moving as a flank guard along the top of the cliffs, picketing from the gorge itself being impossible. The march was nearly twenty-five miles, and the sick were carried on donkeys.

The Rowanduz Gorge must be one of the most magnificent canyons in the world, it is about twelve miles long, in some places 4,000 feet deep, and nowhere more than about a quarter of a mile across. At the bottom runs a turbulent river, and the road runs a few feet above it. Near the entrance to the gorge a gigantic spring gushes out of the solid rock about 150 feet above the river into which it plunges with a thunder-like roar; the river is spanned by a small bridge about five feet wide, which was crossed by the

whole force ; this bridge broke the day after the column had passed. The gorge eventually widens out into a broad, boggy valley, through which the column struggled to Benawi. In the gorge, a Turkish pack saddle with a stretcher attached to it was seen—this must have been left by the enemy in his retreat ; apparently the Turks, too, have difficulty in carrying stretchers on pack animals in billy country.

On the return march from Benawi to Serkhuma, the epidemic of diarrhœa assumed really serious proportions ; up to April 25, the regimental medical officer had treated 270 men, all in one battalion, and definite dysenteric symptoms now appeared amongst them for the first time. It was therefore recommended on April 26 that the battalion should be sent to a station where it would no longer be a menace to the health of the rest of the column, and where the condition could be bacteriologically investigated.

The insidious onset of the disease, absence of fever, and the improvement on the exhibition of emetine, indicated that the dysentery was probably amœbic in origin ; this was subsequently verified in the laboratory. Diarrhœa had by now appeared in the other British battalion, six cases having been sent to the field ambulance.

At this period the work of the field ambulance was extremely arduous, from Balasan to Girde-Tille over 150 sick and wounded were carried and cared for by the detachment of the unit then with the column. Six cases of dysentery were sufficiently serious to require hand carriage for the last twenty miles ; fifty British other ranks and thirty Khurdish prisoners were detailed to assist the field ambulance bearers in this duty. Donkeys were provided for the remainder and proved an excellent method of carrying sitting cases. The donkey convoys were rather too prominent a feature of the column, and soon were hailed by the healthy men, as they came into camp, with cries of H.L.I. (*Hospital Light Infantry*).

On this return march hostile villages were destroyed and cattle, goats and sheep commandeered. These flocks were driven along with the column so that a supply of fresh milk was available for the sick.

On April 17 the column reached a village (Girde-Tille) five miles from Serkhuma, where it was possible for large aeroplanes to land, and it was here that the unique value of aerial evacuation was proved for the first time.

A Vernon ambulance aeroplane, specially fitted up to carry both lying and sitting patients, was sent from Kirkuk, shortly after the arrival of Koicol, but unfortunately it crashed on landing, and was so badly damaged that it could take no further part in the operations. On the following day four troop-carrying Vernons evacuated twenty-nine of the most serious cases, and during the three days five wounded and one hundred and eleven sick were conveyed by air to the base hospital at Baghdad. The machines were not specially constructed for the carriage of sick, but it was found that by covering the floor with a thick bed of grass and weeds, the patients were made comfortable, and the risk of soiling the body of the machine

was greatly diminished. The journey was usually undertaken in two stages; the machines with the most powerful engines being used as far as Kirkuk, because it was necessary to rise to a considerable altitude to clear the higher ranges and avoid "bumping" due to "air pockets." At Kirkuk the cases were transferred to other 'planes, which carried them to Baghdad. The total distance by air is approximately 220 miles, and the journey occupied about four hours. The majority of the patients were more or less air sick, but none of them was really any the worse for his flight. The enormous superiority of this method of evacuation of casualties, where it is possible, in mountain warfare and in operations in semi-civilized countries, will be appreciated when it is realized that the journey by land would have taken at least six days, partly on donkeys over the mountains, and partly by motor ambulance convoy across the desert, during which the sick must at least have suffered very severe hardships.

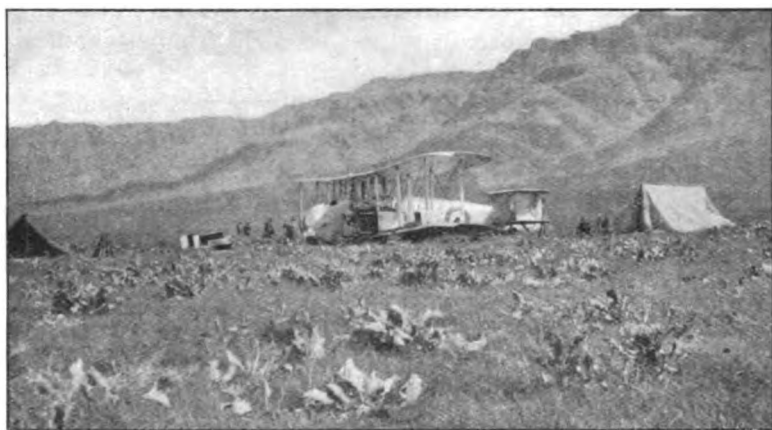


FIG. 7.—Damaged ambulance aeroplane at Girde Tille—116 sick and wounded were evacuated to Baghdad by air from this landing ground.

During this evacuation there was only one accident, and this, fortunately, was attended by no serious results. One machine carrying sick had to make a forced landing about twenty miles south of Koi Sanjak. The Deputy P.M.O., Royal Air Force, who was superintending the enplaning at Kirkuk, flew to the spot and arranged for the two most serious cases to be sent by Bristol 'planes to Kirkuk, while he took the others on mules to Koi Sanjak. All were eventually transferred to Baghdad by Vernons.

The S.M.O., Koicol, accompanied the first load of sick, discussed the medical situation with air headquarters at Baghdad, and flew back to the column next morning.

The detachment of the field ambulance remained at Girde Tille, until all the serious cases were sent away, and rejoined the column at Serkhuma on 30th. At Serkhuma khaki drill clothing was issued; this was very

welcome as the weather by now was becoming warm ; the old serge, much of which must have been infected, was burnt.

On May 1 the march was continued over the Sultan Dagħ to Koi Sanjak. All the sick who had not then been evacuated, and those who fell out, were carried on donkeys ; as the pass was narrow and steep, and the weather warm, they arrived late and tired in camp. In order to minimize the inevitable fatigue and discomfort of the patients, the field ambulance was divided into two echelons on the march. One followed immediately behind the main body of fighting troops, with the tents and equipment and sufficient personnel to open at once on arrival at the halting place ; the other, consisting of the sick, on slow travelling donkeys, and their attendants preceded the rear guard. By this arrangement it was possible to pitch tents and prepare food before the patients arrived in camp.

Four Vernon aeroplanes were waiting for the column at Koi Sanjak ; as soon as the patients had been fed and attended to, thirty-eight of them were sent away in these machines, and on the following day thirty-four more were collected, this making a total of 194 casualties evacuated by air up to date.

The column was now complete again, and left Koi Sanjak after one night's halt. The weather had become very hot, and the first day's march of about eighteen miles was a severe strain on the tired troops. Over one hundred men fell out. By shortening the marches, starting soon after daybreak, carrying the men's packs on transport animals, marching in shirts, jackets being carried in the packs, and ensuring that all troops had some food before starting and carried a haversack ration, things were considerably improved, and the next day, although the field ambulance started with seventy-two patients on donkeys, only four men fell out on the march of ten miles.

Koicol halted on May 3 on the Lesser Zab River, and this was the first opportunity on which it was possible to utilize the local form of raft (killeg). Six killegs were commandeered, and twenty-five patients with a medical officer were sent down the river to Altun Keupri, where the motor ambulance convoy had already opened a detention hospital. The patients all reached Altun Keupri safely and dry the next day, but killegs are not by any means an ideal method of transporting sick, they are frail craft, and often become partially submerged ; in rough water, unless very skilfully handled, they will bump into the river banks or sink altogether.

Two short marches along the valley of the Lesser Zab brought the column to Altun Keupri. A number of sick were still carried on donkeys, but many of them were merely suffering from abrasions of the feet, the result of new boots or even of the absence of boots. The wet weather, the rough stony ground, and the constant crossing through rivers, had proved too much for most of the boots. The boot situation had been so acute at one time, that a supply of new boots was dropped from the air. As it was carried out, it is not a good method of "delivering the goods" ; a

dropping ground was selected, but only a proportion of the boots fell in the proper place, some fell inside the camp, considerably upsetting the transport animals ; some fell so far outside the camp that they could not be salvaged, and a great many of those that were collected had been badly damaged by their fall. Delivery of liquid drugs from the air is also not to be recommended ; with so many cases of diarrhoea, the supply of castor oil was becoming low, and a tin of it was attached to a parachute and liberated from an aeroplane over the dropping ground. It landed in the right place, but, unfortunately, in spite of the parachute, it "burst on impact ;" it is sad that a precious box of cigars was in the same parcel.

At Altun Keupri all the sick remaining in the field ambulance were handed over to the motor ambulance convoy, and the wheeled transport, which had been left at Erbil, now rejoined the column.

The British battalions had become so weakened by sickness that it was not considered advisable to expose them to further hardship, particularly during the hot weather, and the Indian battalion was due for repatriation to India. The three units marched down the Lesser Zab, by easy stages, independently and on different days, and crossing the river at Fattah Ferry, entrained at Baiji for Baghdad. For this manœuvre a detachment from Shergat opened a detention hospital at Baiji ; motor ambulance cars followed each battalion, and casualties occurring on the march were carried to Baiji, whence they were transferred to Baghdad by ambulance train.

The remaining units of Koicol then marched to Kirkuk, where three fresh Indian battalions were assembling to join them. Meanwhile, the motor ambulance convoy, assisted by armoured cars, evacuated all the remaining sick (130) to Shergat, a distance of seventy miles of very indifferent road, and then rejoined the column at Kirkuk. The sick crossed the river at Shergat in the motor launches which had been sent there from Kuweir.

The first phase of the operations was now completed, and Koicol entered upon its final rôle, to advance on Sulimania, the stronghold of Sheikh Mahmoud.

As the column now consisted almost entirely of Indian troops, the composition of the field ambulance was altered. The British section was replaced by Indian personnel from Mosul, only sufficient British other ranks being kept for the more technical duties. Of the surplus R.A.M.C. non-commissioned officers and men, some were employed in the sanitary section with the column, and in the detention hospital formed by the motor ambulance convoy at Kirkuk ; the remainder were sent to Baghdad, to augment the R.A.F. medical service in the cantonment detention hospital for military personnel.

For the operations about to be undertaken, the motor ambulance convoy opened a detention hospital at Kirkuk, capable of accommodating eighty cases. It was proposed that as soon as the Sulimania road was safe, casualties from the column should be collected by the M.A.C. and detained

at Kirkuk, those requiring prolonged treatment being carried across the desert to Fattah and Baiji, in the ambulance cars. Air evacuation was only to be used in severe and urgent cases, as both pilots and machines were beginning to feel the strain of the heavy work they had carried out in the Rowanduz area.

The newly constituted column, accompanied by its wheeled transport, left Kirkuk on May 12, and made a short march of eight miles. On the 13th it was twenty-three miles west of the Bazian Pass. Resistance was anticipated at the Pass, and it had been intended to attack it at dawn on the 15th. On the 13th, however, air reconnaissance reported no enemy west of the Pass, and as there was a healthy camping ground, with an unlimited supply of good water, about two miles from it, the column marched twenty-one miles to this spot. The Pass was not held by the enemy, so the heights were picketed, and Koicol halted for the night. On the 15th, enemy horsemen were reported to be in the neighbourhood of the Tasluja Pass, so a second long march (twenty-two miles) was made this day through it, and the column halted in Sulimania plain, some ten miles west of the town. This rapid advance—forty-three miles in two days—completely surprised the enemy, who, it was ascertained later, intended to hold the Tasluja Pass, but they only learnt, on May 15, of the departure of Koicol from Kirkuk. Considering the heat, the character of the country and the heights to be picketed, this march was a remarkable performance of the infantry.

Forty-two men were carried in the ambulance wagons, suffering chiefly from relapses of old malaria or blistered feet, but in the circumstances this number was not excessive. The camping ground at Sarchinar, four miles from Sulimania town, was reached after a short six-mile march on May 16. This camp was ideally situated on high ground bordering on a rapidly-flowing mountain river of crystal clear water, and a day's rest in such surroundings proved of great benefit to the whole force.

Sheikh Mahmoud, on May 14 and 15, had been only a few miles north of the Tasluja Pass, and on the rapid approach of the column, he at once retired to the Sherdash hills. With the occupation of Sulimania, another of the objectives of Koicol had been fulfilled; it now remained to break up the semi-military organization which Sheikh Mahmoud had created, turn his forces out of the villages, and impress the tribes in the district in which he had established his stronghold. The forced march had brought the column so close on the enemy's heels, that the Colonel Commandant decided to push on at once, leaving no garrison at Sulimania. As the Sulimania-Kirkuk road was not considered safe, the motor ambulance convoy could not be utilized for the evacuation of sick, so Air Headquarters was asked to send aeroplanes for this purpose.

In two days it was possible to send away forty-eight cases only, and forty-two had still to be carried with the column.

During the next three days, a large number of men fell out on account of sore feet, or fatigue, so that donkeys had again to be impressed for the

slight cases. A total of 114 sick was brought into camp by the field ambulance on the third day's march, none of them was really ill, and the majority would be fit for duty after a few days' rest.

On May 20 the march was continued to Dukkhan (35 miles), on the Lesser Zab, along a valley with the Serdash Range on the north rising more than 3,000 feet. Sheikh Mahmoud had retreated to these wild mountains. In searching the villages a remarkable cave was discovered, which had evidently been used as his headquarters; not far away a large supply of barley, and, on the return journey, a dump of 75 mm. German ammunition, were found. At Dukkhan all wheeled transport was again left behind. The garrison was provided by a composite battalion which included all men unfit to march. The tent division of the field ambulance also remained at Dukkhan, with thirty-three sick. The remainder of the column marched over the Kara-Sirda-Dagh Pass on May 21, and, descending into the Mirgah plain, split up into three forces, to collect cattle and destroy hostile villages in the neighbourhood. This was accomplished without serious resistance.

Koicol reassembled at Dukkhan three days later, and returned to Sulimania, destroying villages and strongholds *en route*.

Sulimania is notorious as a malarial district from June to September; it was therefore recommended that the troops should be kept there for as short a time as the political situation would permit. As it was necessary, however, that they should remain for a month, active antimalaria measures were instituted. The camp was moved to a more suitable site, on higher ground, about half a mile away; mosquito nets were issued, irrigation channels were cleared and marshy ground drained, all pools being filled in or treated with oil.

While the column remained at Sarchinar, permission was obtained for the motor ambulance convoy to use the road from Kirkuk, escorted by levy cavalry or armoured cars; by this means over one hundred sick were sent to Kirkuk.

The column stayed at Sulimania and Sarchinar until June 16, when the troops returned to their stations in three columns by Kirkuk and Baiji. The health of the men was excellent, and the number of cases of primary malaria negligible.

Koicol ceased to exist from June 19, 1923.

II.

The expedition brought out many points, both professional and administrative, of the greatest interest to the medical service.

(1) *The large number of deformed feet found at Erbil.*—No doubt very many of these men were enlisted during the aftermath of the war, when the physical examination and training of the recruit was less strict than it is now. It must never be forgotten that the infantryman marches on his feet. In our Army, where small wars among hills must be catered for, it is false economy to pass recruits into the infantry with marked deformities of the feet. In peace time these men struggle through the depot and when

with their battalions they avoid route marches by being employed on "staff jobs" as mess orderlies, batmen, firemen or postmen, etc., but on active service, when they must march, they let their battalions down every time. It is freely admitted, however, that many soldiers with marked flat foot and similar conditions do constantly perform most strenuous marches without ever giving in. The value of training was emphasized by the fact that nearly all the cases of blistered feet occurred in the newly-arrived battalion. Another point brought out by these conditions is the necessity of providing some sort of carriage for the sick which travels at the same pace as the troops. There is a tendency in this mechanical age, partly as the result of experience in France, to "scrap" all except motor ambulance transport. Had this principle been adopted in Koicol large numbers of men would have been sent to the base from Kuweir and Erbil who, after a couple of days riding in the horsed ambulance wagons or on donkeys, were quite fit for duty.

(2) *The Dysentery Epidemic.*—This was a very typical example of a "carrier epidemic." The writer had an opportunity, after Koicol had been disbanded, of learning about dysentery at Quetta. Amoebic dysentery is endemic at Quetta, and many men in the battalion had been treated for dysentery and diarrhoea while stationed there before going to Iraq. The mild cases had been treated by dieting, castor oil, etc., the more severe with emetine. There can be no doubt that there must have been many carriers in the battalion when it joined the column. The hardship and exposure were sufficient to light up the latent condition, and the close contact at Koi Sanjak and in the muddy wet camp at Serkhuma was all that was required to spread the disease. The limitation of the trouble to one battalion for over a fortnight and its first appearance in one company are interesting. The water supply (usually from beautiful mountain springs, or streams, only requiring chlorination when the column halted near a village) and the rations were the same for all the troops in the column, and the weather was too wet for flies to be troublesome.

(3) *Malaria in the Sulimania District.*—Although as much as possible was done to prevent an outbreak of malaria at Sarchinar in June, the fact that the column escaped infection was probably chiefly due to good luck, it was, no doubt, one of those years which occur in all malarial districts, when the condition appears late or diminishes naturally.

(4) *Methods of Evacuation of Casualties* :—

(a) *Air.* It is the first occasion in our Army in which so many casualties have been removed by air. That the R.A.F. safely conveyed about 250 sick and wounded from the forces in the field to the base, over 200 miles away in difficult flying country, was a very splendid performance. Where suitable conditions exist, this method of carrying casualties is, in every way, far in advance of any other, and should be considered in future medical schemes and in the selection of main dressing and casualty clearing stations.

Air evacuation, at present, however, has its limits. The greatest difficulty is finding suitable landing grounds, and these are generally most rare in just the type of country in which air evacuation is otherwise of the greatest value. Weather conditions, too, have a very important influence. We have much to learn from the R.A.F. and a very close and friendly liaison must always exist between the medical services of the land and air forces. There is, indeed, a good deal to be said in favour of combining them under one directorate.

(b) *M.A.C.* The motor ambulance convoy, when used with mobile columns without lines of communication, should be so organized as to be capable of forming detention hospitals, as the unit may be called upon to look after sick for a considerable period. The transport for the extra personnel and equipment must be independent of the motor ambulance cars. During these operations, a total of 473 cases were dealt with by 10th M.A.C., and of these 147 were returned to duty from Kirkuk, the remaining (326) being conveyed to railhead in the ambulance cars. It is estimated that many of the Ford ambulance cars covered over 5,000 miles during the four months that Koicol was operating, and, although they had already seen considerable service, they proved to be very satisfactory and none had to be abandoned.

(c) “*The Transport of the Country.*” The donkeys met with on the frontier in India are often decried as being unsuitable and too small to carry sick men in hilly country. The Khurdish donkey is generally smaller than those seen in India, and yet he proved himself invaluable for this service, when left to pick his own way and driven in herds by the local tribesmen.

(5) *A Pack Field Ambulance.*—Some of the chief difficulties of the medical service were due to the fact that much of the equipment was unsuitable for pack transport, and that the field ambulance sections could not easily be adapted to the formation of detached hospitals. The regulation stretchers gave most trouble; even over good roads these made a clumsy load, very difficult to adjust and, on account of their length, awkward for an animal to carry. It should not be difficult to design a folding stretcher, which would fit into a specially-made container. Several other articles of equipment require special carriers for pack transport. Great inconvenience was experienced when it was necessary to split up the field ambulance into detachments, as each of these had to be entirely self-contained and might have been called upon to perform the functions of both bearer and tent divisions. Such detachments had to be prepared at short notice, and, each time, it was necessary to re-arrange the loads and redistribute the personnel. Considering the variety of country in which our Army must be ready to operate, there is surely room in its medical establishments for a real pack field ambulance comparable to a pack battery of artillery or a field company of sappers and miners.

NOTES FROM THE RECORDS OF THE LOUISE MARGARET HOSPITAL.

BY LIEUTENANT-COLONEL P. C. T. DAVY, C.M.G.

Royal Army Medical Corps.

THE hospital contains fifty-five beds. It is divided into a maternity section containing three labour wards and twenty-five lying-in wards, and a general section containing fourteen beds for women and thirteen for children. In addition there has been added this year a section for officers' families consisting of a labour-ward and two lying-in wards, three single-bedded wards for general cases, and a ward of eight beds for children.

A hospital of this size, full as it usually is, naturally provides a wealth of clinical material. More than this, it deals with cases in numbers large enough to justify the hope that their consideration may be of interest and not without value.

The period under review is from the beginning of 1924 to August of 1927—i.e., three years and eight months.

I propose first to deal with the maternity side.

During this period there were 2,200 confinements. A general consideration of this series is of considerable interest in tracing the influence, if any, of antenatal examination and institutional management upon the course of parturition and the puerperium.

Calculation of Term.—Throughout the period one method of calculating the expected date of delivery has been uniformly employed—viz., three months back from the first day of the last period, and add seven days. Excluding all premature births, this method has given an average error of 6·3 days. There have been apparently only four cases of true post-maturity in the series.

The following table shows the cases analysed by presentation :—

L.O.A.	..	..	..	56·0	per cent.
R.O.A.	..	..	..	33·2	..
R.O.P.	..	..	..	3·0	..
L.O.P.	..	..	..	2·1	..
Breech	..	..	..	4·2	..
Face	..	..	..	0·25	..
Transverse	..	..	..	0·13	..

which gives a total vertex presentation of 94·6 per cent. It will be seen that only in one particular is there any marked divergence from the usual text book figures, viz., in the unusually high incidence of the second vertex (R.O.A.).

It is difficult to give an adequate explanation of this. The high incidence occurs equally over the whole three and a half years, during which period many different clinical observers have been responsible for making the records. It may be that a proportion of cases come first into hospital

when labour is well advanced, that they include a number of third vertex (R.O.P.) cases in which rotation has occurred before examination and so escaped observation.

A system of recording antenatal examinations which was started in 1924, enables one to test the accuracy of this supposition, and a comparison of the number of R.O.A. presentations diagnosed antenatally preserves to some extent this abnormally high frequency, it having been thus diagnosed in seventeen per cent of vertex cases. One is forced then to the conclusion that though rotation from R.O.P. to R.O.A. position does early occur with sufficient frequency to escape observation in the labour ward of a hospital, yet R.O.A. is both the lie and the subsequent presentation in a larger proportion of cases than is usually given.

The proportion of persistent occipito-posterior deliveries (twenty per cent) is about normal.

Face presentation occurred in the proportion of 1 in 400 labours. In no case was it a cause of dystocia.

Breech Presentation.—My practice in these cases has been influenced by the necessity of providing opportunity of practising version for officers undergoing courses of instruction; and at the same time providing the pupil midwives with a sufficiency of breech deliveries. The practice then has been to turn primigravidae and to leave multiparæ whose obstetrical history is good. Yet in spite of this the proportion of breech deliveries remains practically normal (4·2 per cent). It must be pointed out here that included in the series are a number of premature births which normally provide a higher proportion of breech deliveries. The futility of turning before the thirty-sixth week has been fully demonstrated by the number of spontaneous versions and recurrences that are met with prior to this period.

Maternal Mortality.—In the 2,200 cases there occurred five maternal deaths. Of these two had not been examined antenatally, and had not intended to be delivered in hospital till the emergency arose which brought them in, viz., one case of eclampsia, and one of obstructed labour. The latter had been more than three days in labour. Repeated attempts at instrumental delivery had been made before admission and she was in an extremely grave condition on arrival. Craniotomy was done, and she died of shock.

It will be seen that even including all the fatal cases, the mortality-rate worked out at 2·2 per thousand—nearly half that given by the Registrar-General for the United Kingdom.

The five deaths were: For eclampsia, 2; obstructed labour, 1; post-partum hæmorrhage, 1; puerperal septicæmia, 1. The fatal case of puerperal septicæmia is of such considerable interest that I give a short résumé of the notes.

Mrs. F., aged 28, primigravida—admitted in labour at term. Normal and easy delivery, second stage one and three quarter hours; three routine

vaginal examinations made; third stage completed rapidly and satisfactorily. Infant six pounds six ounces. The patient on leaving the labour ward had a temperature of 100° F., pulse 120.

A history was obtained that six weeks previously she had had a sore throat associated with joint pains and swelling of legs. This had cleared up but had left her debilitated. Twenty-four hours after delivery, temperature was 102° F., with painful swelling of ankles and wrists. Three days later erythema nodosum appeared on the extremities and later changed to a definitely purpuric eruption. On the eighth day systolic and presystolic murmurs were noticed. On the tenth day a hæmolytic streptococcus was isolated from both blood and lochia. Thereafter she ran the typical course of a grave septicæmia and died twenty days after delivery. She was treated with serum and vaccines and locally in the routine manner. Of peculiar interest is the fact that on the seventh day the infant developed idiopathic erysipelas and died the same day. There is no doubt that the source of infection was antepartum in origin and that delivery merely determined the onset of the condition.

Morbidity-Rate.—I have taken as the standard for this, a temperature of 100° F. or over for more than twenty-four hours during the fourteen days after delivery. I have worked out the morbidity figures for the years 1924 and 1925 only. For the remainder of the period they do not apparently materially differ.

Total number of cases showing morbidity:—

1924	..	68 = 11 per cent.
1925	..	64 = 10·9 „

Of these, considering the associated condition recorded:—

74·5	per cent.	had uncomplicated labours.
25·5	„	„ complicated labours.
21·0	„	„ abnormal lochia.
20·0	„	„ mastitis.
13·0	„	„ coincident disease.
42·5	„	„ no obvious cause for pyrexia.

In only twelve per cent of these cases did the pyrexia occur on the third day—quite at variance with the time-honoured tradition. The remainder were scattered impartially over the whole puerperium.

The figures are of interest in as much as they show that even where conditions are made as favourable as possible, a completely apyrexial puerperium is only obtained in some ninety per cent of cases. It must be remembered, however, that in a teaching hospital as this is, pupil midwives and medical officers must be afforded facilities for making vaginal examinations at all stages of labour which otherwise would not be necessary. Moreover, pupil midwives are constantly coming and going, and there are at all times those who are yet in the rudimentary stage of experience and knowledge. A system which is rigidly enforced ensures that the names of everyone making a vaginal examination are recorded on the chart of the

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case concerned. This has on occasion been the means of tracing a series of morbidity cases to an individual.

Complications of Labour.—I shall consider here only the principal ones:—

(a) *Placenta prævia*: There were twenty-one cases with no maternal death-rate, but a foetal mortality of ninety per cent. In the majority of cases the diagnosis was made early. The routine management has been—plugging, the De Ribes bag, and version at the earliest possible moment with leg traction. Only one case was dealt with by Cæsarean section. One case was noteworthy in that though the placenta was central, and had to be traversed in performing version, yet the child survived. All statistics give a mortality of something like 99·9 per cent in such cases.

(b) *Accidental hæmorrhage*: There were thirty cases of this, none of the gravest type. The routine management which has been found satisfactory has been morphia, plugging, rupture of the membranes. I have not done Cæsarean section for this condition. The alleged association of accidental hæmorrhage with toxæmia has not been clearly established in our series.

(c) *Prolapse of the cord*: This has occurred in five cases. The textbook methods of dealing with this serious complication are in my opinion hopelessly difficult and impracticable. A manœuvre which I recently learnt of getting the cord well down, wrapping it well up in a bundle of sterile gauze and returning the whole well past the presenting part offers a much better chance of its staying where you have put it. I shall never attempt to deal with such a case in any other way.

(d) *Post-partum hæmorrhage*: This is recorded in fifty-six cases. It was the cause of one maternal death—a case in which the contractile action of the uterus was notably lacking throughout. Secondary plugging some hours later in the theatre failed and the woman died about eighteen hours after delivery.

(e) *Adherent placenta*: The records show twenty-three cases of this. The term is elastic and there are included only those requiring manual removal. I have found that inexperienced midwives in their anxiety lest the uterine contractions should fail in the third stage, often over-knead the uterus. This nagging at the organ undoubtedly contributes to the setting up of a spasm, with the consequent retention of a placenta which is not really adherent at all. Our pupils are taught that while the hand should be kept upon it, the uterus should be left alone as long as it is contracting. Above all, of course, premature efforts at expulsion must be avoided.

Cæsarean Section.—This was performed 19 times, of which 17 were for contracted pelvis, 1 was for persistent transverse presentation, 1 was for central placenta prævia associated with grave toxæmia. In one of these cases the operation was done twice within the period we are considering. There was no maternal mortality, and the infant survived in all but one case.

No extreme case of contracted pelvis was met with. The smallest true conjugate was measured to be three inches, or just under.

It must be noted that something like ninety-nine per cent of women delivered in hospital have been examined antenatally at least once—many more than once. All primigravidæ and multiparæ with doubtful obstetric histories undergo pelvimetry. The fit of the foetal head has, however, always been regarded as the test of supreme value. Dealt with in this way, the appropriate management of a case of contracted pelvis has usually been fairly obvious. About one-third of the cases of Cæsarean section have fallen within the class which allowed of a trial of labour (of course without any vaginal examination) before operation was ultimately decided upon.

Only one method of suturing the uterus has been employed both by myself and my colleagues, viz., two layer sutures of silk. I have always employed this method, and in the two cases in which I have done the operation twice on the same patient, the soundness of the old suture line which results from silk was most striking.

Of the cases there are only two which merit further reference :—

Mrs. J., primigravida, aged 32, attended antenatal clinic. A normally developed healthy woman. Gait normal. Her measurements were : Interspinous, $11\frac{1}{2}$ inches ; intercrystal, $9\frac{1}{2}$ inches ; external conjugate, 8 inches.

No specific record appears that the fit of the foetal head was tested. She was seen once antenatally, and it is possible that, deceived by the apparent normality of the case, the supreme test was overlooked.

On February 24, 1924, the medical officer on duty telephoned me that high forceps on a completely floating head had failed, and he had, quite properly, given up the attempt. I found a somewhat contracted outlet, but this was clearly not the reason for the difficulty at the stage. Cæsarean section was done, and such extreme distortion of the brim was found at operation that it seemed at first that there was an osteoma. The case was one of Naegele's pelvis, and the maldevelopment of one ala of the sacrum shows up fairly well in the skiagram which was subsequently taken. This is a rare case, but illustrates well the importance of Munro-Kerr's test, as, had it been done our course would have been clear from the outset.

The other case is that of Mrs. M., primigravida, aged 25. An advanced case of phthisis with large cavities at both apices. She was sent to me for an opinion by a civil practitioner who was to attend her in her confinement. Unfortunately she was then too near the twenty-eighth week to terminate pregnancy, which earlier would have been indicated. I left her for induction at the earliest moment. She was very ill-developed, and had a justo minor pelvis with a true conjugate of three inches. The foetus was small. She disappeared, and returned about the eighth month. The foetal head could then by no means be made to enter. Her general condition was very bad—orthopnoea, an incessant cough, much wasting, and a rapid pulse. She remained in hospital, and improved much in the last four weeks of pregnancy, but could obviously not stand a general anæsthetic. Cæsarean

section under stovaine was done at term, and a child of seven pounds delivered. The patient was sterilized. The interesting thing is that she has improved very markedly in the seven months since delivery. She is quite apyrexial and putting on a lot of weight.

In one other "failed forceps" case which came to Cæsarean section I delivered the placenta *per vaginam*, and swabbed the uterus with brilliant green-violet solution, passing the swabs out also by the vagina. The convalescence was uneventful. I believe these measures are of value as an alternative to hysterectomy in such infected cases.

Forceps Delivery.—Forceps were applied in ninety-seven cases, i.e., four per cent. The condition which most frequently called for their use was in occipito-posterior cases, either after manual rotation or after spontaneous rotation, in which flexion was deficient. A few only were cases of frank disproportion between cavity or outlet and foetal head.

That institutional midwifery is of immense advantage to the woman admits of little argument, but one is inclined to think that perhaps the most incalculable benefit lies (or should lie) in saving her from the obstetrical forceps. Removed from anxious relations, under the constant observation of a staff to whom time is no object, and in the atmosphere of calm routine which prevails, Nature, who, after all, is not a bad midwife, is allowed a hand. The ultimate good to the woman lies undoubtedly in patience. This counsel of perfection, of course, breaks down too often in other circumstances, but conscientious antenatal examination should do much to preserve it.

Toxæmia of Pregnancy.—It is impossible to deal more than cursorily with this subject here. Taking the presence of albumin in the urine without other symptoms as a manifestation of toxæmia in its simplest form, this is recorded in five per cent of 1,500 cases. There is reason to suppose that this proportion holds good over the whole series.

At the other end of the scale there were nine cases of eclampsia with two deaths in the whole series. In the intermediate class there were forty-six cases which exhibited toxæmic symptoms of a severity necessitating admission into hospital. Of these there were but three cases of pernicious vomiting.

Induction of labour for threatened eclampsia was done on four occasions. The remaining cases yielded to treatment, and came spontaneously into labour after admission, or later at term.

For many years at the Louise Margaret Hospital there has been one routine treatment for toxæmic conditions in all their forms—the eliminative treatment. In severe cases absolute fasting, with ingestion of a large amount of water combined with intensive saline purgation. In the actual eclamptic state this line of treatment holds good with modifications necessary in the circumstances. Stomach and colon lavage is always carried out, leaving magnesium sulphate in the stomach. This is repeated frequently if fits continue. Chloroform is administered when necessary to control the fits, and to allow the lavage to be done. Morphia and othe

hypnotics are very sparingly used. Veratrone has been found of no use. Great stress is laid on the importance of keeping the patient's head well down and on the side, to keep her from being drowned by her own secretions. Vapour baths have been found of proved value.

One word more is necessary on the subject of the vomiting of pregnancy. All who have worked in the hospital must have been struck by the paucity of admissions from this cause compared with its apparent frequency outside. There were, as I have mentioned, three cases of true toxic vomiting, of which two had to have the pregnancy terminated. Admissions for minor degrees of this condition and for neurotic vomiting were extremely rare.

There is a popular idea that a pregnant woman requires plenty of food washed down, perhaps, with a bottle or two of stout, but I believe it is really otherwise. In our antenatal work the importance of aperients and of limiting the diet is constantly taught, and this is emphasized in the case of women showing any sign of toxicity.

We perhaps flatter ourselves in thinking that our antenatal advice has anything to do with our comparative freedom from toxæmic conditions, but it may be so.

GENERAL WARDS.

The number of cases admitted during the period was: Women, 932; children, 1,449. And the deaths: Women, 15; children, 98.

The vast majority of the women dealt with being in the third and fourth decades of life, the accidents and ailments associated with the child-bearing period and their sequelæ, make up a considerable proportion of the admissions. The remainder were the ordinary diseases, accidents and emergencies met with in a general hospital. I shall limit myself therefore more particularly to the gynæcological work.

In looking back upon the work of the general wards during these three and a half years, there stands out very clearly an impression of the extreme frequency of infection by *Bacillus coli* of the female urinary tract. A study of the records and notes of cases confirms this, and brings out very clearly that the condition is a very fruitful source of confusion and mistaken diagnosis. It is difficult to give actual figures, for in many cases it is merely a coincident condition.

When the infection is confined to the bladder, the symptoms are those of acute or subacute cystitis, but long-standing chronic cases with irritability of the bladder, and symptoms suggestive of partial incontinence are common enough. When the higher urinary tract is acutely involved, fever, rigors, vomiting, a rapid pulse, general malaise, pain in one or both flanks, or referred to the iliac fossæ, and a brown dry tongue, constitute a common picture. Such a case, especially where the local pain and tenderness seem confined (as frequently happens) to the right iliac fossa and flank, bears a baffling resemblance to appendicitis. I remember some six years ago seeing a girl, aged 8, in two such attacks, in which it was the urinary findings alone which strengthened one in the decision against operation. The case eventually cleared up under an autovaccine. In another type of acute or

subacute pyelitis where headache, general malaise and joint pains are prominent, the case is naturally diagnosed influenza or rheumatism. It is thus protean in its manifestations, and since the diagnosis is only established by culture of the urine, the resources of a hospital are usually necessary to clear the case up. Its particular association with pregnancy is well known, but owing to the tendency to recurrence, if not thoroughly treated, it is met with very frequently in non-pregnant women who no doubt date the original infection from a former pregnancy. Our experience is that a vaccine (preferably but not necessarily an autovaccine) is a most potent and valuable agent in the cure. Of all vaccines I consider that of *B. coli* is the most trustworthy in its effects. It is of course necessary to render the urine alkaline.

During the period under review, 1,439 operations under a general anæsthetic were performed. Of these some twenty-five per cent were gynecological in the true sense of the word. From what I have said of the average age of patients it will not be surprising that malignant disease was very rarely met with.

Uterine Carcinoma.—I have seen but three cases within the period, all of them unfortunately being hopelessly inoperable.

Breast Cancer.—There were six cases—five of carcinoma and one of myxosarcoma. They were all treated by the most radical removal, but recurrence is known to have occurred in three cases. The other cases, as far as is known, remain free, one of them being so for two and a half years.

One of the fatal cases has some points of interest: Mrs. B., aged 35, five children (youngest 9 months, which she suckled for three weeks only), admitted when twenty-two weeks pregnant. There was a definite and clear history that there was no lump nor anything noticed wrong with the breast until eight weeks before admission. There was found on admission an extensive growth of the upper and outer quadrant with widespread skin involvement and enlargement of axillary and supraclavicular glands. The pregnancy not only complicated matters from the point of view of operation, but contributed to the intense malignancy which the growth clearly showed. The consulting surgeon, whilst doubting operability, advised the widest possible removal as a palliative measure. The axillary vein was damaged in stripping off the involved tissue in which it was embedded, and I was obliged to tie both this and the axillary artery. The supraclavicular glands were removed as far as was possible, but pretty obviously not in their entirety. The sequel was that she did not abort, and that the establishment of collateral circulation in the arm never gave any cause for anxiety. The wound healed well by granulation and she was up on the fourteenth day. She finally miscarried at seven and a half months and died of secondary deposits in the abdomen one week later. I do not regret the course adopted as there was no local recurrence and her end was comparatively painless.

The growth was a spheroidal-celled carcinoma of encephaloid type.

The bulk of the gynæcological work consisted of operations for the correction of displacements of the womb, repair of the cervix, vagina and perineum, the removal of ovarian tumours, the removal of infected and pregnant tubes, and curettage for various causes.

Misplacements of the Uterus.—The commonest met with is retroversion or retroflexion accompanied more or less by slackness of vaginal walls, and a deficient perineum. For the most part these patients are the victims of a too enthusiastic wielder of the obstetrical forceps. For many years my experience has confirmed me in what I believe is universally taught by gynæcologists, that whilst a few of these cases can be successfully dealt with by the vagina alone, none can be successfully dealt with by the abdominal route alone.

The few are those cases where the uterine descent is slight, the cervix torn and unhealthy, and the cystocele marked. In such cases some buttress operation, combined with amputation of the cervix such as Fothergill describes, answers very well indeed.

Where you find a badly sagging vagina, a meagre perineal body, and a uterus in Douglas's pouch, the operation popularly called the "round trip" is the only one worth doing. As to what you should do when you have opened the abdomen, I think you must be guided by the conditions found. Where the round ligaments are rudimentary, or weak or stretched, ventral suspension is the best procedure. I have had the opportunity of seeing two patients in labour on whom I had done ventral suspension one or two years previously, and parturition was quite normal. There is of course a risk of trouble, so one would choose this method with a quieter mind in cases where a future pregnancy is not anticipated.

If the round ligaments are strong, though perhaps stretched, there is not much to choose between slinging the uterus posteriorly (Baldy-Webster method), and shortening them (modified Gilliam). In the cases I have been able to follow up in which one or other of these methods have been employed some of those posteriorly slung have complained of pain, but the uterus has remained well cocked up.

In those in which the round ligaments have been shortened there has in one or two been local tenderness which eventually disappeared, but always the uterus has remained in good position. Either operation relieves the symptoms equally well.

Ectopic Gestation.—There were nine operations for this condition with no death. All had ruptured and were admitted as abdominal emergencies, the condition was occasionally mistaken for appendicitis, but generally diagnosed before operation. One of these was of more than ordinary interest.

Mrs. — attended out-patients with a complaint of sharp attacks of pain in the right iliac fossa. I, and then an officer under instruction from the College, examined her. A swelling of the right adnexa was apparent, and while we were discussing the case the patient collapsed in the waiting-room as she was leaving the building. She became blanched and pulseless

in the few minutes we observed her. She was hurried off in an ambulance, and her abdomen was opened within the hour. She was an early tubal pregnancy, and one or other of us had ruptured it.

A blood-count has not in our experience proved of much assistance in the cases of ruptured tubal pregnancy. A reduction in total red cells seems fairly constant, and fits in well with the pale waxy facies which is so often a characteristic feature of the condition. White-cell count does not help much; both leucopenia and leucocytosis have been observed. Quite remarkable is the smoothness and rapidity of convalescence of these cases after operation.

Sterility.—The practice of gynecology rather inclines one to divide patients into two main classes—the sterile who want children, and the fertile who do not. In the class from which our patients are drawn, the number who consult one for sterility is surprisingly large. We have been doing tubal insufflation in the hospital for about a year. Provis's apparatus is used. The technique is very simple, and an anæsthetic is rarely required. Complete passivity on the part of the patient is, I am convinced, essential for an accurate reading, and so it is better to give an anæsthetic if the patient is at all nervous and jumpy.

The findings by this method invariably conform to the condition found at subsequent laparotomy. In the few cases in which I have done salpingostomy, none have so far become pregnant. Neither, so far, have I heard of pregnancy in a case of sterility where gas entry into the tubes was demonstrated at a first or subsequent test. Still I consider the procedure of value, perhaps as a curative measure, and undoubtedly from the point of view of diagnosis, inasmuch as it affords a means of demonstrating the total occlusion of the Fallopian tubes. Where this state of things has been proved, the futility of dilating the cervix becomes apparent. Notwithstanding all this, that simple dilatation of the cervix is occasionally followed by pregnancy in the previously sterile is an undoubted fact.

Hysterectomy.—The total operation was done four times and the subtotal five times. There were three deaths—two from intestinal obstruction (parietic) and one from general peritonitis. In all but two cases the operation was done for fibro-myomata. One of the exceptions was a case fairly typical clinically of chorion epithelioma. At operation the naked-eye appearance confirmed this. The patient later had symptoms pointing to secondary deposits in lungs and spine, and she died of peritonitis. The pathological report, however, was negative.

The other case was that of a woman who had been confined in her quarters sixteen days before. After being up a few days, symptoms supervened necessitating admission. A pelvic abscess was found and drained by colpotomy. Drainage, however, was unsatisfactory. Laparotomy was then done and an acute double salpingitis and pyometra was found. The whole metrium, too, was infiltrated with pus. Total extirpation was done and both vaginal and abdominal drainage provided. She made an uneventful recovery. *B. coli* was found in pure culture at both operations.

There was only a mild leucocytosis and the constitutional disturbance throughout the illness was surprisingly small.

There is not space within the limits of this article to deal with the remaining surgical work at any length.

Appendicectomy was done fifty times with two deaths, both in children. Our experience is that appendicitis in children is often an obscure and puzzling condition. The general constitutional disturbance is so frequently not in proportion to the severity of the condition found at operation. Some of our worst cases have shown little or no change of pulse or temperature. The decubitus and typical abdominal facies generally, however, afford a clue. I have grown to place much faith in these in the absence of the signs which in an adult one would accept as pathognomonic. Not much reliance can be placed on the white-cell count in children. The diagnosis of appendicitis in children, then, is often extremely difficult, and leaves one on the horns of a dilemma. On the one hand, if the appendix is really inflamed, there must be no delay in operating, because such cases so rapidly slip through one's fingers; on the other hand, children stand abdominal section so badly that an unnecessary operation is often a tragedy.

Herniotomy.—Of the large number of hernias operated upon, there were three into the canal of Nuck, in adults. The remaining adult cases were femoral or umbilical. There were a considerable number of operations on children for congenital inguinal hernia. In infants operation is best deferred till they are 18 months or 2 years old. If immediately sealed with collodion, they usually heal well. There were only two cases of strangulated hernia in infants during the period. Strangely enough, these were admitted within forty-eight hours of each other.

Other Abdominal Operations.—There were five operations on the gall-bladder, all for gall-stones. In three cases I found that it was possible to conserve the gall-bladder. In two cases excision of the gall-bladder was necessary. In one of these a stone was found impacted in the common bile duct just at the ampulla. It was removed by incision and subsequent suture of the duct. All the cases did well.

Gastro-enterostomy was done twice; partial gastrectomy once.

Intussusception.—There were five operations for this with four deaths.

Hypertrophic Stenosis of the Pylorus.—Eight cases of this were diagnosed during the period. Seven of these cases were treated by gastric lavage, with two deaths, Rammstedt's operation was done on the other case with a very satisfactory result. Gastric lavage is a slow and tedious method of dealing with these cases, but with patience success is occasionally attained. Rammstedt's operation is easy to perform, and in the case treated in this way the improvement was dramatically sudden and complete.

Operation for Tonsils and Adenoids.—There were 519 cases of this with one death, due to anæsthetic poisoning. In only one case was serious hæmorrhage recorded.

Mastoid Operations.—There were seventeen operations with two deaths, due to intracranial complications.

TEACHING OF TROPICAL MEDICINE IN THE SERVICES.¹

BY SURGEON REAR-ADMIRAL SIR PERCY WILLIAM BASSETT-SMITH,
K.C.B., C.M.G. (R.N., ret.), F.R.C.P., F.R.C.S.

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I COUNT it as one of my greatest advantages that my serious education in tropical diseases began in the first course of the newly formed School of Tropical Medicine at the Albert Dock Hospital, in 1899, under the guidance and teaching of the late Sir Patrick Manson, whom we all revered and loved as the Father of the English School of Tropical Medicine. He was a most delightful clinical teacher, always arresting attention and holding his hearers in a grip of silent admiration by his lucid and often humorous descriptions. He was, however, not only a great clinician, observer, and research worker, but a great judge of character and ability also, never failing to bring out any latent ability in his class; always encouraging all to give their best.

This great teacher recognized the enormous importance to the Empire of sending out fully instructed medical officers to practise medicine and surgery in our "wide-flung Empire." His example for the Civil and Colonial services was followed by the establishment of more efficient schools and teaching, both in the Navy and Army.

In "Health Problems of the Empire," Dr. Andrew Balfour has given a most lucid and interesting account of the insanitary conditions which prevailed in past times, and the steady progress of knowledge which has been acquired and used in transforming these deplorable states into those of comparative health at home and abroad. In this educational work the establishment of the Ministry of Health and the formation of such bodies as the Royal Sanitary Institute have been most helpful. Balfour quotes the words of the late Mr. Joseph Chamberlain: "I would be prepared to give preference in filling up medical appointments in the Colonies to those candidates who could show that they had studied tropical medicine and hygiene, especially if some certificate or diploma to that effect was forthcoming." We know that this has been established, and his suggestion has been more or less strictly enforced for colonial medical officers.

In regard to my own Service, I hold it as an article of faith that it is almost criminal to send out medical officers to tropical countries to be in charge of large bodies of men, without giving these officers an efficient training in the recognition and treatment of such tropical diseases as are common in the locality where they are to serve. As our knowledge increases, this becomes all the more imperative.

¹ The paper was read at a meeting of the Naval, Military, and Royal Air Force Hygiene Group of the Society of Medical Officers of Health, held on July 27, 1927.

In the Navy we had great pioneers, such as Sir Richard Hawkins, who, in 1593, provided distilled water for men in his ship, the "Dainty"; Dr. Lind, Sir Gilbert Blane, Dr. Trotter, and Sir William Burnett were others who taught and practised the importance of the adequate diffusion of knowledge in the fight against tropical and communal diseases. The last-named in 1827 made arrangements for the instruction of medical officers in the Navy; in 1881 a school was opened at Haslar, and in 1900, following Manson's lead, special tropical courses were instituted there with clinical and laboratory instruction. In 1912 the school was transferred to Greenwich, where it was more in touch with other teaching centres in London. In the planning of this school we had the ready and invaluable help of the late Sir William Leishman. There were provided not only large bacterial and chemical laboratories, in association with clinical cases in the Dreadnought hospital, but also research rooms in anticipation of special requirements. The Navy was thus ready and able to take its place in Imperial medicine, and worked hard for the prevention of the diseases which affected it most. Men were turned out efficiently instructed to take up their duties in any part of the world, for frequently they might be more or less isolated units—up rivers or on unhealthy coasts—where this previous instruction was of enormous importance and value. It must be remembered that the course of such diseases as plague, cholera, and yellow fever may be extremely rapid, and early recognition and the application of preventive measures are of the utmost importance.

A young medical officer, after leaving his own school or college, having obtained his ordinary qualification, knows practically nothing of the bacteriological, zoological, and entomological facts required for tropical medical practice. Some have obtained the Diploma in Public Health only to find that they have just started upon the road, and that the course of training for the Diploma in Tropical Medicine and Hygiene—even the Diploma itself—though rarely obtained, alone furnishes what is wanted.

The course at the Royal Army Medical College is most excellent. In pre-war times our newly joined surgeons were, as I have shown, fairly well equipped, but since 1914 this has, with us, been allowed to lapse, *and until the full course on entry is established, the men will be badly prepared for tropical practice.*

I think it is essential that not only should men be given courses of instruction, but that every encouragement should be provided for them to obtain special qualifications, with specialized pay and opportunities for research. I should like to emphasize the extraordinary efficiency, as a teaching centre, that the collection housed in the Wellcome Museum in London provides for those who will use it; every tropical disease is most admirably portrayed, and he who runs may read easily, so that final clinical study is enormously assisted when opportunity offers, for it must be generally recognized that the lack of cases is the greatest difficulty for the tropical student in London.

Recently the importance of a thorough course in tropical hygiene in its widest sense has been demonstrated by the munificent gift of the Rockefeller Foundation, and the issue of a *Bulletin of Hygiene*—already a sturdy child. Each medical officer must be able to act as an adviser and example to others; to do this he must be properly taught. Take, for instance, the effects of heat and protection from the sun. How different are the results in varying geographical areas. In India it is madness to go about without adequate head protection where the humidity is so often high, and yet in North Australia it is less important, for the air is so dry that evaporation is very rapid, heat dispersion is much greater, and the danger of sunstroke is much less. The importance of avoidance of alcohol, protection of the eyes by efficient glasses, the danger of chills to the abdomen, and the regulation of the dietary to the conditions present, with a full understanding of the frequency with which food may carry infection, also need emphasis. Think of the case of three medical officers on cholera duty, one of whom returning to lunch, in his haste, omitted to wash his hands properly; he was dead the next morning. An object lesson for carrying out hygienic precautions. We know that also typhoid, dysentery, and undulant fever are all food-borne diseases. All these, and many other facts, have to be taught, and this requires time—time well and profitably spent. Natives as a rule are totally ignorant of hygienic rules, and when employed as servants, as they usually are, require the strictest supervision. "Ignorance is not bliss." Abroad, water and milk have practically always to be sterilized, and green vegetables are taboo. Safeguard from bacterial infection, never mind the vitamins! Think what a mass of suffering and loss of health would have been avoided had we always boiled our milk in the Mediterranean area. It is impossible to go into detail as to what should be taught, but it must embrace a good knowledge of vaccine therapy, parasitology, entomology, particularly of the blood-sucking forms and the infections carried by them, with a working knowledge of the common entozoa, etc.

I should like, however, to enter a protest against overloading the course of study by restricting these special lines of instruction to insects and parasites definitely known to affect or act as carriers to the *human* species.

For a moment I should like to refer to the possibility of the medical units of the fighting services being amalgamated, when, presumably, the teaching centre would be the Royal Army Medical College, and the initial course would take place there. From a purely tropical point of view I think that such a combination would be a great advantage both from a laboratory and a clinical point of view. Nevertheless, full use should be made of the cases and clinical instruction from the newly established Professor of Medicine at the Royal Naval Hospital at Haslar; this latter would probably be most useful for officers returning from a sea commission and preparatory to going out on foreign service.

I have only touched superficially on the subject, in the hope that

discussion will be favoured by those who have much greater experience than I have. Every year research into tropical diseases reveals facts of importance in relation to prophylaxis, but which require teaching if full advantage is to be obtained from them. Before such teaching can be given, those who are to teach must, and should, acquire the necessary knowledge themselves in order to fit them to occupy positions of great responsibility for safeguarding the health of masses of more or less ignorant men.

Finally, with regard to study, the wise words of Confucius should be remembered :—

“Study must be pursued with discretion, and can no more be divorced from thought than thought can be from it.”

“Learning without thought is labour lost ;
Thought without learning is perilous.”



A LITTLE KNOWLEDGE.

BY COLONEL F. SMITH, C.B., C.M.G., D.S.O.

PHASE I.

THE advanced guard was well on its way along the narrow track through the dense, evergreen bush.

Grouped about in the open space where the overnight camp had been, soldiers, mostly negroes, of the little column, were standing round expiring wood fires from which faint blue spirals of smoke ascended; for there was a chill air.

Carriers were sitting on, or squatting near, the loads destined to be borne on the straw-padded heads of these substitutes for transport animals and G.S. wagons. An officer and the native headman were bustling about together, re-apportioning the loads of the discontented, and searching for heads on which might be toted some of the packages which seemed to be surplus, and were found to be the heaviest. Loud protests could be heard from men who, with a far-away look, had been sitting alongside the lightest objects they had been able to find, as, for example, a roll of straw matting weighing about two pounds.

Around one fire some officers, including the major in command, were enjoying the after-breakfast smoke while their baggage was being packed and dealt out to a ring of selected carriers sitting near them. Suddenly attention was drawn by a sharp cry to one of the carriers, who sprang up and clutched his own left arm, calling out, "Wow, snake done get me."

"Where? Where is it?" said young Stevens excitedly, as he looked fiercely about him, and handled his gun to the danger of the bystanders. Stevens was an earnest soldier, who carried a double-barrelled shot gun in the hope of emulating Colonel Burnaby.

"Look ahm daddy," came from the mouths of half a dozen carriers, delighted at being in the piece, as they pointed eagerly to a speckled reptile winding itself away and already within a few feet of cover. Dashing forward, the brave Stevens—just as the serpent, allowing curiosity to overcome wisdom, paused, reared its head and looked back—let it have two barrels simultaneously and blew it all to bits. The hero turned towards his fellow officers triumphantly as he opened the ejector.

"Well done, Stevens. But where's the doctor?" exclaimed Major Ironsmith-Farrier, glancing around.

"Gone on with Martin, sir," answered two or three voices.

"Good Lord! Something must be done quickly, at all events," and the major, who had been through a first-aid course and rather fancied himself, secretly glad to have a chance in the absence of Wilson, cheerfully took on the treatment of the poor carrier. The last-mentioned, never in

his life having been the object of such solicitude, was making the most of his wound.

"Must make him drunk," said the O.C., and an officer soon dashed up with a canteen lid nearly full of rum. Gulping down the beverage, the victim gasped and began an appreciative grin, but, suddenly recollecting himself, groaned instead.

"You'll find a bottle of brandy in that box over there," cried the director of operations as he threw out the keys from his pocket.

But the major himself had not been idle all these minutes, he was not only directing, but doing. Seizing a piece of stout cord, he bound it tightly round the limb, just below the wound; then he slashed the part with his pocket knife. The native orderly having meantime opened a pannier, the commander grabbed the carbolic acid container and rubbed some of its contents into the scarified area. This made the carrier howl as if he meant it, so brandy was poured into him.

Soon the man was, no doubt, either drunk or dying; for he could not be roused.

Responsibility had now to be transferred, though the major was loth to part with his patient, in whom he naturally took pride.

So we arrive at a further stage in the management of the case.

PHASE II.

Martin and Wilson were sitting on the brim of a slope while the men not on sentry lay around, during the first halt. After having marched along a track walled-in with bush, it was delightful to get away from the sensation of being shut up. The officers smoked in silence as they gazed down rapturously on the mass of tree-tops; many trees were in flower; numerous butterflies and birds were flitting about; a surface liveliness in this upper world, in vivid contrast to the sombre shades beneath. The gorgeous carpet spread down into the valley, and up the steep reverse, until it merged into the bluish-white haze about the foot of the distant hills. Sounds as of torrential water rose from the depths of the gorge. "It's a lovely world . . . in parts. But . . ."

"Fall in!" shouted Martin, breaking in on the doctor's meanderings, as he and Wilson came suddenly out of their peaceful reverie on hearing running feet in the rear; and the officer hastily disposed his men.

There was no cause for alarm as far as concerned human enemies. A panting soldier appeared, saluted, and handed to the officer one of those flimsy bits of paper used for pencilled messages in the field.

Martin passed the document to Wilson, who read:—

"Dear Wilson,

"This carrier has been bitten by a snake (poisonous). We have given him a canteen-lidful of rum and the best part of a bottle of old liqueur brandy. He is now fairly drunk, and I send him along to you.

Yours,

J. IRONSMITH-FARRIER."

Soon appeared a cavalcade consisting of four carriers having on their respective heads the ends of the cross-bars of a hammock pole. Suspended in the hammock was the limp body of a native. Alongside walked the medical orderly.

Wilson heard stertorous gurgling before he reached the hammock. Carrier Dirty-boy—to give him his official designation—was evidently in a bad way. He was getting in a little air at long intervals with difficulty. He could not be said to be more black in the face than usual, but he bore a congested look about the face and neck generally.

Wilson promptly seized the man's tongue, with immediate relief to Dirty-boy—but he could not stand there holding on to a slippery tongue; so he handed that part of Dirty-boy's anatomy to the orderly, who hung on to it with such determined energy that the portion in view got longer and longer, and there seemed to be danger of the whole thing coming away in his hands.

The next thing was to remove the ligature from the limb, already swollen as though about to burst, and dress the wound—work intermitted by an occasional chest-squeeze whenever it seemed that the patient had given up breathing.

Meantime, a soldier had been sent back for the panniers, and from one of them a pair of long forceps was produced. By the time Wilson had clamped Dirty-boy's tongue and tied the forceps to the hammock, the fretting advanced guard officer moved off his party. The orderly was to walk by his charge to see that the tongue was out, and to summon the doctor if breathing stopped.

The four carriers expressed their disgust at having to carry their drunken comrade—they, no doubt, each and all, envied him.

For some time Dirty-boy's fate was a matter of speculation. Wilson had to squirt in a few hypodermics.

Some thirty hours later the sick man opened his eyes, looked round, remarked, "Me 'ead dey 'urt me," and promptly relapsed into lethargy. In this state he was deposited in the hospital of a bush station occupied *en route* by the column.

Paying a visit the next morning before marching off Wilson found the hero sitting up, smiling. He said he had taken some breakfast but was feeling stiff and sore all over, so he was allowed to remain behind in hospital. As the doctor moved off Dirty-boy remarked:—

"Dat big medicine, Sah! for true."

Wilson, of course, was rather pleased with the result of the combined treatment, and thought to himself, "Something in these old empirical methods, after all—remember my grandfather telling me that a bottle of whiskey was the thing for snake-bite."

As the force was about to resume its forward move, the headman of carriers, on being informed of the marvellous recovery of the carrier of whom he had perforce to lose the services, admitted that it was indeed

wonderful. He himself had known men die from less drink than that—still, it was in its way a pleasant death—quite a waste of rum of course—he and several more might have been made quite happy with that amount—an undue favouring of Dirty-boy—supposed that was because he always carried the Major's box.

"But it was to cure the snake-bite," said Wilson.

"A mere nothing, that bite—not as if a bad snake had bitten him," replied headman Allblack, though not exactly in the words as here written.

"My God, my God!" cried the healer; a chill in his heart though he was not primarily responsible, "that snake not poisonous?"

"What, sah? What t'ing dat? Me no sabby de word."

"Dat snake no' able for kill person?" explained the officer.

"No, sah!" and the headman lifted his eyebrows, "He just bite; that, no more."

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"It's no use talking. Those natives are just lying. They're full of superstitious ideas about offending the snake tribes. The man was for it all right," insisted the Major, when Wilson gave him the news. "Anyhow," he added, "it's up to you to replace that brandy."

So Wilson supplied a bottle of "Three Star" from the medical supplies. His C.O. accepted it with a "grouse" that it was better than nothing, but could not make up for his old liqueur stuff.

When seen some long time after the event Dirty-boy bore a very fine mark on his arm. He showed no resentment, indeed he smiled joyfully at the recollection of his gratuitous orgy.

To this day Major Ironsmith-Farrier is fond of relating the story of how he treated the snake-bite. The reptile gets bigger and bigger. When last heard of it was "a deadly puff-adder, my boy, and as thick as a man's wrist."



Editorial.

THE PREVENTION OF DIPHTHERIA.

SINCE the introduction of antitoxin treatment the medical profession has been inclined to regard diphtheria as a disease which is disappearing from the community. It is true that we now seldom see throats covered with a dense membrane, followed by paralytic sequelæ, which were so common some thirty-five years ago, and that the mortality has fallen more than twenty per cent under antitoxin treatment, yet the returns of the Metropolitan Asylums Board show that the prevalence of diphtheria is increasing. In London between 1904 and 1924, the attack rate per 1,000 persons living rose from 11·2 to 19·1, and the Asylums Board Report for 1924-25 stated that, "notwithstanding the great improvement in diagnosis, standard of living, education in matters of hygiene and other public health measures, the fact remains that for reasons not altogether clear diphtheria appears to be strengthening its forces and gathering power unchecked by science." As a contrast to what has been occurring in this country, diphtheria in New York has exhibited a marked decline in recent years, which has been attributed to the extensive employment of immunization of children of school age by toxin-antitoxin.

In order to understand why the public health measures in vogue prior to the introduction of active immunization by toxin-antitoxin have apparently failed to diminish the incidence of diphtheria it is necessary to consider briefly the main facts in relation to the causative organism, its virulence, localization and survival in man or animals and its mode of transmission to the patient.

For much information we are indebted to the monograph on Diphtheria and the Report on the Prevention of Diphtheria, published by the Medical Research Council.

Most of the older literature is of little value as the diphtheria bacillus was not distinguished from Hoffmann's bacillus and from diphtheroids, which are not uncommonly met with both in man and animals.

The *Corynebacterium diphtheriæ* found associated with cases of diphtheria is now considered to have definite cultural reactions and a certain virulence. There has been in the past some confusion between virulence and toxicity, but now it is generally agreed that virulence means the power of producing disease in the animal body, while toxicity is the power of producing toxin in culture—a power which does not necessarily run parallel with virulence. There is no evidence that virulence is lost by prolonged sojourn in the throat of human beings, or that a non-virulent bacillus of the Hoffmann or diphtheroid type ever acquires virulence. Virulence can be tested on guinea-pigs and all the evidence supports the idea that a bacillus which is

non-virulent to guinea-pigs is non-virulent to man, and a strain which is virulent to guinea-pigs is also virulent to man, but not necessarily to the same degree. The test must, however, be performed under definite conditions as regards culture media, duration of growth, etc. For some time there was considerable doubt as to whether *subcutaneous* and *intra-cutaneous* injections gave concordant results. A definite technique has been worked out by Zingher and Soletsky, and also by Eagleton and Baxter, and employing these methods the results of the two tests have agreed completely.

As regards the localization and survival of *C. diphtheria* as a factor of infection, the discovery of the bacillus in the throats of persons who were not only well but had never had the disease, led to the suggestion that the diphtheria bacillus is a ubiquitous organism, and that the sporadic spread is due to chance infection from man, animals, or dust generally. Research soon showed that there was no truth in this concept, and that the *C. diphtheria* as now defined is only found in close association with cases of the disease.

At the present day no one doubts that diphtheria is caused by the *C. diphtheria* and that it must be present in every case, but instances arise in which the bacillus is not found, or in which it is non-virulent. These cases are probably due to a mixed infection, and the virulent bacilli being few in number have been missed.

Cases of so-called "larval diphtheria" are known in which the toxic signs are not fully developed and the patient remains ambulatory. This condition is generally associated with the nose. A membrane is present and the bacilli are usually virulent, and it has been suggested that there is a local mechanism in the nose which either destroys the toxin or prevents its absorption. Convalescents from diphtheria generally lose their bacilli in a few days. Hartley and Martin showed that five per cent of convalescents became negative every day; in Weaver's series the figure was nine per cent. Curves constructed from figures furnished by Büsing, Hartley and Martin, and Weaver are very similar.

Some convalescents retain the infection for long periods; this is generally associated with an abnormal condition of the tonsils, nose or pharynx. The diphtheria bacilli remain virulent.

Contacts with cases of diphtheria may harbour diphtheria bacilli. When the contact is close, as in barracks, hospitals and institutions, the results obtained by various observers indicated that fifteen per cent of the persons tested were carriers and all the strains were virulent. In affected households eight per cent of the persons tested were found to harbour diphtheria bacilli, and in seven per cent the bacilli were virulent.

When persons who, as far as could be ascertained, had not been in contact with a case of diphtheria were tested by various observers, four per cent were found to harbour diphtheria bacilli, but of these cases only 0.6 per cent carried virulent bacilli.

Healthy carriers as a rule lose their bacilli in about ten days. According to Weaver, the rate of cure of healthy carriers not subjected to treatment is slower than in convalescent carriers, only four per cent become negative every day as compared with nine per cent of convalescents.

Carriers seldom suffer from diphtheria owing to the presence of anti-toxin in the blood, and must be differentiated from persons incubating the disease and harbouring diphtheria bacilli in their throats; these people have no antitoxin circulating in the blood and sooner or later will suffer from the disease.

We must now consider the mechanism of spread of *C. diphtheriæ*. In the majority of cases the exact mechanism by which the bacillus is spread to a patient must remain a matter of conjecture. Usually the bacillus is spread from an infected person by droplets ejected during speaking and coughing. The number of bacilli present in the throat has an important influence. When they are few they are more likely to give rise to immunity, but when they are many they are likely to cause disease in other persons. According to Arkwright the number of bacilli in the sputum is the real determining factor; he found twenty-four convalescents with bacilli in the throat, but in only half of these were the bacilli present in the sputum.

Assemblage of susceptible people in large rooms may be looked upon as an important factor in the development of diphtheria in schools, institutions, barracks, etc.

Dormitories seem to have a greater influence than living-rooms. Denny found only one carrier among eighty boys in a school, who slept in separate rooms, while there were fifteen carriers among seventy other boys who slept in two large rooms.

Evidence of the spread of diphtheria by means of infected articles is slight, and it is only likely to occur when the infection is abundant and of recent date. Spread of the disease by dust from floors and walls of rooms, and by means of draughts or drain air is most improbable.

At one time, as a result of some research work carried out by Klein, cows and cats were thought to suffer from diphtheria. Klein injected cows with diphtheria bacilli, and four days later vesicles, which ultimately formed scabs, appeared on the udders. These he regarded as evidence of diphtheria in cows, and when he found what appeared to be diphtheria bacilli in the milk, he believed that they had come from the local lesion. We know now that "scabby teats" may occur as a specific disease of cows, and the diphtheria bacilli may be superadded when the cows are milked by a diphtheria carrier. Only through the agency of a carrier does milk become a cause of diphtheria in human beings.

Klein thought that cats suffered from diphtheria, and that "fatty kidneys" were diagnostic of the disease. Savage's work on normal cats and cats associated with diphtheria lends no support to Klein's views.

Having briefly considered some of the most important points in con-

nexion with the localization, survival and mode of transmission of diphtheria bacilli, we will now discuss the prevention of diphtheria in the light of the older methods and of modern ideas of immunization.

In order to prevent diphtheria we may concentrate our efforts on limiting the dissemination of the bacillus by means of isolation and disinfection which were the standard methods for many years. By isolation we mean the segregation of persons infected with virulent bacilli until they are free from infection. The actual case is generally removed to hospital before he has had time to infect many people. Mass swabbing of contacts is carried out with the object of finding the carrier who has infected the case. It is open to doubt how far it is justifiable to isolate carriers of non-virulent bacilli. The time taken to determine virulence may defeat our object, and the simplest method seems to be the isolation of all contacts until virulence is determined, but isolation in civil life is generally regarded as unjustifiable unless the bacilli in the throat of the contact are from time to time shown to be virulent.

Isolation is most successful in limited outbreaks where the number of infected persons shown by swabbing is small. Isolation is not usually a decisive measure in civil life and the decision to practise it is generally determined by the results of the Schick test. If most of the persons affected are immune it is now considered best to immunize the susceptible, but if most of the people are susceptible then these should be isolated, as, owing to the time taken to develop immunity, the risk of infection is great. In military life owing to the assemblage of considerable numbers of men in barrack rooms where they live and *sleep*, and their congregation in various institutions, the risk of mass infection is much greater than in the ordinary household. Isolation can readily be made effective, and in these circumstances it would seem best to isolate all soldier carriers of diphtheria bacilli until the bacilli have disappeared, or have been shown to be non-virulent.

Disinfection of carriers by local antiseptics has been attempted, but is now considered futile. Tonsillectomy gives better results. In ninety cases after operation, Harries and MacFarlane found virulent bacilli present on eleven occasions, once in the throat and ten times in the nose. The patients were generally clear thirty-one days after the operation. Only one doubtful "return" case followed the discharge of these ninety cases from hospital.

Disinfection of objects contaminated by the patient should of course be carried out, but as very few bacilli exist outside the immediate vicinity of the patient, disinfection of dwellings is not likely to be of much value.

For thirty years it has been known that relative immunity may be conferred by the injection of antitoxin, but this treatment has not found much favour in the control of diphtheria, as antitoxin rapidly disappears from the blood and the person again becomes susceptible.

Antitoxin is not usually demonstrable in the blood of man beyond three weeks, the period depending to some extent on the amount injected. Diphtheria may be prevented in exposed children with a considerable

degree of certainty by the injection of 500 units of antitoxin, but the protection fails if the child is already incubating the disease and after four weeks injections of antitoxin interfere with active immunization which is more permanent and therefore more satisfactory. Injection of antitoxin may be considered in a community remote from medical control and when there is a great probability of other cases occurring.

Dzierzowski was the first to use injections of toxin to produce active immunity in man. But the practice did not find much favour owing to the fear, apparently groundless, of producing paralysis. As a result of his experiments on guinea-pigs, Th. Smith suggested that the injection of toxin-antitoxin should be tried on man. Practical application of this method was not made until 1913, when v. Behring introduced his new method of toxin-antitoxin injection. Later on the toxin was reduced so that the mixture was less toxic than that used in America at the present day.

In 1913 Schick brought out his well-known test, which is now used to indicate the susceptibility of a person to diphtheria and also to differentiate between carriers of diphtheria bacilli and persons incubating the disease.

The amount of toxin used is $\frac{1}{50}$ minimal lethal dose and stock toxin is diluted until the amount indicated is contained in 0.2 cubic centimetre. The diluted toxin heated to 75° C. for five minutes is also used as a control. The chief danger of error lies in mistaking a positive and pseudo-reaction for a negative and pseudo-reaction. A susceptible person will then be looked upon as immune. Positive and pseudo-reactors are, however, rare. Children who give a plain positive reaction show as a rule no ill effects, but those who are pseudo-positive show local swelling and tenderness and have a constitutional reaction.

As a result of the work carried out by Drs. Park, Zingher and Schroder, the use of the Schick test and toxin-antitoxin inoculation has steadily progressed and every year increasing numbers of children have been tested and immunized in schools and institutions in New York and elsewhere in the States. By April, 1926, Dr. Park reported that more than two million injections of toxin-antitoxin had been given in New York State alone without any disaster occurring. With the older methods in use he found in 1922 that the number of cases of diphtheria was reduced to one-fourth.

The preparation of the toxin for test and the toxin-antitoxin mixture for immunization requires great care and strict attention to detail, otherwise accidents may happen. In 1919 at Dallas (Texas), five deaths and forty cases of severe reaction occurred, due to the required amount of toxin being added to the antitoxin in two separate portions, a toxic mixture resulted, instead of a neutral mixture harmless to guinea-pigs, which is formed when the toxin is added whole to the antitoxin.

At Concord and Bridgwater, Massachusetts, some forty children suffered from local inflammatory reaction and marked constitutional

symptoms, due to the use of toxin-antitoxin mixture, which after distribution had been exposed to temperatures below freezing point and then thawed. Other tubes of the same batch which had not been frozen, produced no unusual reactions.

The disadvantages arising from the use of the earlier type of toxin-antitoxin mixture have now been overcome as the result of research work carried out at the Wellcome Research Laboratories. By treating the toxin with formalin, a reduction in toxicity has been effected and the new preparations, toxoid and toxoid-antitoxin, give rise to little local or constitutional reaction. A similar preparation of toxin, known as anatoxin, is in use in France and other countries.

Children can be given the full dose of toxoid-antitoxin, but it is considered advisable to "desensitize" adults with a small preliminary dose. The first series of injections occupies a period of two to three weeks. Immunity does not develop at once, protection is gradually acquired and takes from three to six or even nine months for its complete development. The Schick test is applied at the end of three months. If a positive reaction is obtained, a further series of injections is given. In a "city" population from 75 to 90 per cent of susceptible persons are completely immunized in from three to six months. In 1922 Dudley pointed out that a natural process of immunization is at work, and in certain social conditions may produce immunity in a comparatively short time. Results attributed to toxin-antitoxin injections may to a great extent be due to natural immunization, and it seems likely that in the production of immunity lasting for some years, the natural process plays a great part. It has been found that an urban population exposed to the protecting influence of small doses of infection is more readily immunized than a rural population, and the duration of immunity is also longer.

The evidence obtained in America seems to show that effective protection may last for six years, and may even extend to ten years and thus tide children over the most susceptible years of life.

The occurrence of diphtheria in persons who on Schick testing have been declared naturally immune has received considerable attention. It is possible that a massive dose of toxin may not be neutralized by the existing antitoxin, and clinical diphtheria, usually of a mild type, may result.

Cases of diphtheria have also been reported amongst those who have received toxin-antitoxin injections, but generally the symptoms have developed before there has been time for complete immunity to develop.

Dr. Peters, of the Ham Green Hospital, Bristol, states that although a Schick-negative test always indicates a comparatively high immunity, under the exceptional circumstances of exposure of a fever hospital staff to virulent infections in massive doses, the negative response may not always mean complete clinical immunity. The type of case, however, in such negative reactions is usually mild when compared with the severe attacks seen in the unprotected staff in previous years.

Dr. O'Brien and his colleagues consider that the chance of a person negative to the Schick test suffering from diphtheria is small, and that in the rare cases where possibly an infection may occur, the attack will be mild. They have known of a number of patients who had been considered to have developed diphtheria, though they had previously given a negative response to the Schick test, but in none of these had there been found indubitable clinical diphtheria, when the evidence for the Schick reaction was impregnable.

"Carriers" properly so-called, with virulent bacilli in their throats, are always Schick-negative and supervening tonsillitis due to some other organism might well account for a case being notified as diphtheria.

The control of diphtheria in residential schools, hospitals and other institutions is readily effected by combining the Schick test with bacteriological examinations of throat and nose swabbings, and virulence tests applied to any diphtheria culture so found. The susceptible Schick positives will be immunized without delay and non-susceptible virulent carriers segregated and treated until swabbings prove negative, or until all the susceptible persons have been successfully immunized. The control of Schick positives with virulent bacilli, viz., of those immediately threatened with an attack, will lead to the rapid recognition and prevention of further actual cases.

The Medical Officer of the Ministry of Health stresses the importance of immunizing nurses and others employed in infectious diseases hospitals.

The high incidence and the excessive mortality in the age-group 1 to 5, shows the importance of immunizing children of pre-school age. Children in this group are nearly always found to be susceptible, and it is recommended that they should be immunized without resort to the Schick test. In older children the test should be applied, as many of them are immune and show considerable reaction when injected with toxin-antitoxin. It should be remembered that when the blood contains passively transmitted antitoxin, the action of the toxin-antitoxin is interfered with, probably because the toxin is over-neutralized.

We owe much to the pioneer work which has been carried on in America. England has much leeway to make up. In Scotland five times as many children have been immunized as in England and Wales together, and over forty times as many in proportion to the population. There is every reason to hope that what antitoxin has done in the treatment of diphtheria, the Schick test and toxoid-antitoxin injection, when properly applied, will be able to do for prevention.

Clinical and other Notes.

REPORT ON FOOD CONTAINERS.

BY MAJOR S. M. HATTERSLEY, M.C.

Royal Army Medical Corps.

DURING collective training, Aldershot Command, in 1926, the food was cooked for the troops in central kitchens, and distributed in hay boxes, such as are described in "The Management of Soldiers' Messing."

Hay boxes are very efficient in keeping food hot, but they have many disadvantages. They are cumbersome and unwieldy. The hay must be packed with care, otherwise there will be great loss of heat, and hay which has been damaged in any way is of no use.

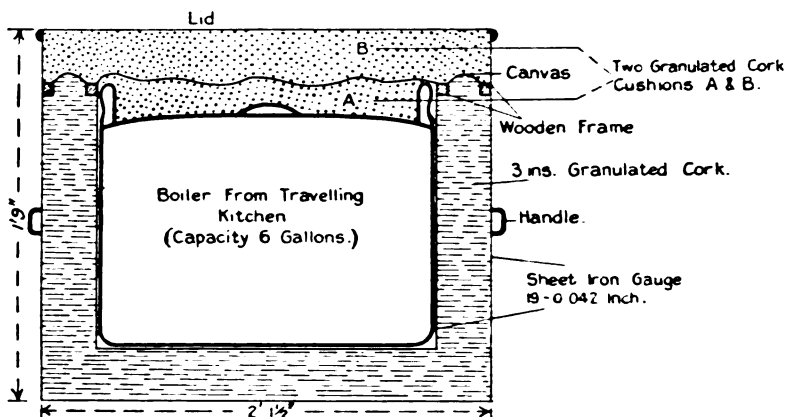
If the principle of cooking food at a central kitchen is to be developed, it will be necessary to have suitable containers for keeping the food hot during distribution. It is easy to imagine the result if large numbers of hay boxes had to be packed in the field during bad weather.

There are many substances which are excellent heat insulators, but which must be ruled out on account of their being too heavy, or too expensive, or of their rapid deterioration in the presence of water, heat, etc. Cotton waste, wood sawdust and hay rapidly deteriorate in the presence of water. Charcoal, slag wool and compressed peat are too heavy. Balsa wood and fibres of *Kingia Australis* have not yet been tested sufficiently to know whether they would be suitable in practice. Cellular expanded rubber, granulated cork and slab cork are light and excellent insulators. The same insulating efficiency can be obtained with approximately half the weight of expanded rubber in a granulated form, as compared with granulated cork, and about quarter of the weight when compared with slab cork. Expanded rubber would, I think, be very expensive, and there is not a large quantity available. Granulated cork would, therefore, seem to be the most suitable substance, packed at about 5½ lb. per cubic foot; it is cheap and a very efficient insulator.

It was ascertained from the Army School of Cookery, Aldershot, that the boilers of the travelling kitchen would be used for distributing the food to the troops. Experiments were, therefore, carried out to devise some suitable container for keeping the food in these boilers hot. They hold about six gallons, and the difficulty of making suitable containers for them is increased by the two handles and the lid with which they are fitted.

In all the experiments the boiler was filled with boiling water, and the temperature of the water taken after twenty-four hours. The results were, of course, influenced to a certain extent by the temperature, humidity, etc., of the atmosphere, but only the minimum temperature registered during the twenty-four hours was noted.

A boiler from a travelling kitchen was placed in a sheet-iron box and surrounded by one and a half inches of granulated cork, which was simply poured round and over the boiler. The temperature of the water after twenty-four hours was 64°C. (147°F.); the minimum outside temperature registered during the twenty-four hours was 11°C. (52°F.). Three inches of cork instead of one and a half inches were used in another experiment and the result after twenty-four hours was 68°C. (154.4°F.), the minimum outside temperature being 13°C. (55.4°F.). By using, therefore, comparatively thin layers of granulated cork, very good results were obtained. The use of the loose cork in this way was of little value from a practical point of view, but it showed what good results could be obtained by using granulated cork as an insulator.



Container to take boiler from travelling kitchen.

Weight of container, 73 lb.; weight of boiler, 16 lb.; capacity of boiler, 6 gals.
Length, 2 ft. $1\frac{1}{2}$ in.; breadth, 1 ft. $5\frac{1}{2}$ in.; height, 1 ft. 9 in.

Two boxes were made of sheet iron. One was just large enough to take a boiler, and the other was six inches bigger in every direction. One box was placed inside the other, and a three-inch space left between the two boxes; this space was filled with granulated cork. A lid containing three inches of cork was made to fit the outside box. It was found that the real difficulty in making an efficient container was due to the fact that there was a space between the lid and the container, through which heat escaped. However well the lid fitted, it was obvious that there must always be a gap, perhaps less than one-eighth of an inch, where there was no cork. Various experiments were carried out, using different lids, but the temperature after twenty-four hours varied between 49°C. (120.2°F.) and 53°C. (127.4°F.), which was not considered satisfactory. It was finally decided that the top of the cork between the sides of the two boxes must be shut off by some material like canvas, and that the cork which was in the lid of the container must be made into a cushion. By doing this there would be

no direct connexion between the boiler and the outside of the container except through the cork. The lid had then no insulating properties, but was used to keep the cork cushion in its place, and protect the contents of the container from rain.

A sketch of the final container is attached. It was made with sheet iron, gauge 19 (0·042 inch) as being lighter, stronger, and less cumbersome than if it were made with wood. It can be easily handled by two men. The temperature of the water after twenty-four hours on three separate occasions, varied from 61° C. (141·8° F.) to 63° C. (145·4° F.), with a minimum outside temperature between 7·5° C. (46° F.) and 10° C. (50° F.).

The container is being handed over to the Army School of Cookery, Aldershot, for further trials.

READY-MADE SOAKAGE PITS.

BY MAJOR J. C. A. DOWSE, M.C.

Royal Army Medical Corps.

AND

CAPTAIN D. POTTINGER, M.C.

Royal Army Medical Corps.

DURING the training season of 1925-26 the British Battalions in Poona viz., the 1st Battalion the Queen's Own Royal West Kent Regiment, and 1st Battalion the King's Shropshire Light Infantry went into camp for one month each.

The camp was situated twenty miles from Poona and was on gently sloping ground in a good position. The various essentials for a suitable camp site were all present, except that it was found impossible to construct any soakage pits for the reception of waste water or urine. This condition arose from the fact that there was scarcely more than two feet of earth in any portion of the camp; below this scanty covering was solid rock. The question of the disposal of urine and waste water from cookhouses etc., became acute. One of us (D.P.) conceived the idea of discharging the urine from the latrines down a near-by ant-heap.

It was found that the ant-heaps absorbed the urine readily, and, like *Oliver Twist*, asked for more. The only dissentient in the scheme was the wily termite, or white ant.

Later on this idea was elaborated and suitable ant-heaps were discovered in close proximity to the various cookhouses and latrines in the camp.

Many of these ant-heaps were used as receptacles for urine and waste kitchen water for over three weeks. In only one case did they show any sign of filling up and becoming unserviceable.

It was estimated that the ant-heap in use near the main cookhouse was capable of absorbing 300 gallons of waste water in the twenty-four hours.

A curious fact was noticed, namely, that after some thousands of gallons of water were poured down the "soakage pit" the termites came out of the ant-heap and began frantic efforts to start building their "home" over again on the surface of the ant-heap. In this position they became an easy prey to cresol solution, and were slaughtered literally in millions.

The system of constructing the soakage pit was essentially simple : the top six inches of the heap were opened up, and several of the large channels exposed ; some stones about the size of one's fist were then put down to make a firm bed. The ubiquitous kerosine oil tin (four-gallon) was then placed on top, holes knocked in the bottom, and a handful of straw or hay put inside to act as a grease trap. The ant-heap mud which had been removed in the first instance, was "slobbered" round the bottom of the tin to make a neat job, and the soakage pit was ready.



The advantages found in this type of pit were: (1) The ease and rapidity with which it could be constructed ; (2) the fact that with care to avoid splashing the pit remained sweet indefinitely ; (3) the difficulty of constructing pits in that type of country was completely overcome.

It was thought that this idea, not claimed as an original one, might be of use to officers in the Corps confronted with the problem of removal of waste water and urine in India, where one frequently finds it difficult to dig any depth below the surface before hitting on rock or large stones. The wide distribution of the white-ant heaps makes it an easy thing to find suitable soakage pits of this type.

The illustration shows the "coffee shop" soakage pit which served the

canteen, cookhouse, and bakery of the "coffee shop" for nearly three weeks. On the day of leaving camp this pit showed no signs of ceasing work.

Our thanks are due to Lieutenant-Colonel A. K. Grant, D.S.O., Commanding 1st Battalion the Queen's Own Royal West Kent Regiment, and Lieutenant-Colonel B. E. Murray, D.S.O., Commanding 1st Battalion the King's Shropshire Light Infantry, for permission to quote our experience as medical officers to their units.

EXTRA-GENITAL CHANCERE.

BY MAJOR L. B. CLARKE,

Royal Army Medical Corps.

Specialist in Dermatology, Burma District.

A CASE presenting somewhat unusual features occurred recently in Rangoon.

Lance-Corporal X was admitted to hospital with gonorrhœa on June 16, 1927. On June 20 my attention was drawn to a swelling of the upper lip, which he had had several days. As the swelling was painless he made no complaint, and it was only due to keen observation on the part of the assistant surgeon that anything abnormal was discovered.

On examination in a good light the swelling was found to involve the whole of the mucous surface of the upper lip, slightly more marked on the left side.

The patient was instructed to retract the lip with fingers and thumbs. A circular ulcer of dull red colour, the size of a sixpence, with a slightly depressed centre, covered with a blood-stained scab, was discovered on the mucous membrane of the lip on the left side. The edges of the ulcer shelved gradually into the surrounding tissue, and there was a considerable element of induration involving the lesion itself and almost the entire lip. Palpation showed not only induration, but also an entire absence of pain. Apart from the urethral discharge there were no other signs of any kind.

Asked as to the history of the sore, the patient stated that on June 7 he had received a blow on the lip when boxing, and that he first noticed the ulcer the next day. This statement was borne out by the fact that he belonged to a boxing team which was visiting the station. He thought that it was due to contact with a front tooth, and that the lip had been injured in this way.

The appearance of the ulcer and the absolute lack of pain, together with the indurated nature of the swelling, indicated most probably a primary chancre.

Unfortunately local antiseptics had already been applied several times and microscopic examination of serum from the sore was therefore out of the question.

The following investigation was carried out :—

June 20 : Blood for the Wassermann test was taken, half the serum being sent to the Central Dermatological Laboratory at Poona, and half to the Pasteur Institute of Burma at Rangoon.

June 21 : An intravenous injection of 0·3 gramme of neosalvarsan was given.

June 25 : The Pasteur Institute reported the blood as negative.

June 27 : A second serum was sent to Poona (unfortunately both specimens sent to Poona became septic in transit).

July 4 : A third serum was sent to the Pasteur Institute.

July 5 : The sore was now healed and had left a shallow circular depression corresponding with its original outline. 0·45 gramme of neosalvarsan was given intravenously and one grain of mercury intramuscularly.

July 7 : The third serum was reported by the Pasteur Institute as being positive, and the diagnosis was thus confirmed.

How the infection was contracted would be a matter of some interest, but unfortunately nothing definite could be established.

The *Spirochaeta pallidum* undoubtedly gained access to the abraded surface of the lip caused by the boxing accident. This much is certain; the rest is conjecture.

The chancre could have been caused in one of two general ways: (1) Directly from an infected person, or (2) indirectly. Under (1) kissing, or an abnormal manner of sexual association might implant the organism on the abrasion. Under (2) articles such as might be shared in common with another soldier: Towels, handkerchiefs, pipes, cups, spoons, and possibly even toothbrushes might have been a possible source of infection. I think, however, that none of these are likely in this case as no other oral syphilides have occurred in the unit.

The boxing glove might have been infected; one such case has been brought to my notice by the consulting dermatologist, but the chances would appear to be against this owing to the absence of other cases and the fact that an incubation period of one day only would have to be assumed.

The explanation, in my opinion, is probably direct contact with a syphilitic lesion, but not in the person from whom gonorrhœa was contracted, as again the incubation period is too short. Intercourse on a previous occasion, which is freely admitted, is most likely the correct solution of the problem.

It is unsatisfactory that no precise information is forthcoming from the patient even after very careful inquiry.

The conclusions to be drawn from this case appear to be :—

(1) The difficulties frequently to be encountered in V.D. work owing to the obscurity of the condition and the great tendency of syphilis to imitate many other diseases.

(2) The possibility of chancres occurring in places other than the genitals and the recognition of their appearances.

(3) The painlessness of nearly all syphilitic manifestations, which is apt to lead both surgeon and patient astray.

(4) The unreliability very often of the patient's explanation of the trouble.

(5) The mistake of applying antiseptics to such lesions before a diagnosis is made. Here they were applied before syphilis was suspected.

(6) The correct interpretation of the Wassermann reaction, recollecting that the blood-serum is, more often than not, negative in the first seventeen days from the commencement of the sore (the pre-Wassermann stage). In this case it was negative on the twelfth day and positive on the twenty-sixth.

These notes are recorded with the object of reminding those who rarely see venereal cases of the importance of the early recognition of syphilitic lesions, and particularly of those which occur in unusual situations.

I have to thank Lieutenant-Colonel S. M. W. Meadows, D.S.O., R.A.M.C., Officer Commanding, British Military Hospital, Rangoon, for permission to publish this case.

Sport.

LOTUS AND BLACK BEAR: SOME ADVENTURES IN KASHMIR: AN ACCOUNT OF THE SLAYING OF THE RECORD BLACK BEAR.

BY MAJOR A. W. HOWLETT.
Royal Army Medical Corps.

FOREWORD.

IN presenting this narrative I seem to owe my readers a double apology, first, for the tax on their credulity; second, as one apologizes for fluking at billiards, for my colossal good luck in making my third black bear a world's record. It may placate them to know that this is the only stroke of such luck I ever did have; and, further, as I made the *bundobust* myself, instead of trusting myself and my fortune (*sic*) to rascally native bankers in Srinagar, and as I found and engaged my own shikari, and as I am luckily for myself a good shot, I was, at least, a good opportunist. As to killing the first two bears with one shot, all I can say is it befell as I tell in the ensuing pages, and old hands at big game shooting will know that it is the strange and unexpected that always happens once you go adventuring in the jungle. The details of the bear itself are given in the last edition of Rowland Ward's "Big Game Records," that eminent firm having prepared and set up the skin for me.

In the end of June of 1921, having passed the hot weather in the plains and my two months' Army leave falling due, I travelled up to Kashmir,

that fabled wonderland of marsh and mountain, of more than English greenery, and of snows as everlasting as those of the Arctic. It is a great country, larger than England, for all that it lies tucked away, as the map would have it, in the far north-west corner of Hindustan. To the north it is conterminous with those vast wastes that hedge in the deserts of Central Asia; and in those valleys the sun shines unseen of men and the blizzard rages to the peril of none. But, for the most part, when people speak of Kashmir they mean that immediate valley that lies round the city of Srinagar. It is like a great sponge thrust down into the cup of the mountains, just as you might thrust one down into a flower pot and then pour water on it until merely a few islands stood up. The mountains stand round peak behind peak, 10, 12, 14,000 feet, and behind those more again, looking over their shoulders, a hundred miles away, 20,000, and more yet, the monsters of the earth, mysterious, proud, cold with the frigidity of diamond-like snows which have never melted since the world began.

No wonder the Moghuls of old, when their fancies turned from the ghastly Indian summer heats to those cool uplands of their ancestors in far off Samarkand and the wild woods of Turkestan, built themselves gardens and pleasaunces in fair Kashmir. It is a strange idea that, till they came and conquered India, the minds of no Indian princes had ever reverted to this mountain refuge. Now, to this day, their gardens run back from the lotus-laden lakes into the recesses of prodigious heights, terrace upon terrace dripping with cool plashing waterways and shaded with giant chenárs; and still stand the old pavilions where they sat to drink in the breezes and the vistas and toyed with their silken favourites, seeming to echo yet the whispers of their idle dalliance though they have long since been dust.

Behind these gardens to which the Srinagar citizens swarm out by boats across the lake on festivals to vie with the brilliant flower beds in the glitter of their adornment, the ravines are carried up into the frowns of mighty peaks till they are lost in the far black ridges; and here the lordly sambur stag and the fierce black bear have their assured homes where no man may assail them. For these are sanctuaries set aside by the State and in them every sort of beast can propagate and rear his young unafraid of man. So it is that in these valleys swarm the bear, the wolf, the fox, the jackal, the martin, the leopard, the wild cat and tiger cat, along with boars and stags down to the little timid musk-deer. From a great ridge overlooking one of these valleys, a valley whose area with all its divagations could not have been much less than one of the smaller English counties, I watched a black bear nosing and poking on the edges of a wheat field which ran up to the limit of cultivation. It was my first glimpse of the savage creatures. I was to see much more of them later. Meanwhile the sight roused in me every instinct of the hunter and awoke wild enthusiasms which had well-nigh slumbered since boyhood.

I stayed no long time in Srinagar, for it was a city which did not greatly attract me. It is like a Venice amongst the mountains. I should say at a rough guess quite half the population live in houseboats, and through all the city areas noisome canals penetrate, serving not only as roads but as drains and even water supply as well. All the citizens who are going to die, die young, very young I should imagine, and those that are left can drink anything. Thus it behoves a stranger to be careful and not to accept too readily assurances that everything is all right.

I made haste to hire a houseboat and its usual staff. In this case it consisted of the boatman and his wife, his brother and his wife, the cook and his wife, two small children of 8 and 10, a *bhisti* (water carrier) and a sweeper. My bearer came, too, as body servant. Being a Pathan he had a lofty contempt for Kashmiris. He was always telling me how frightened they were of him, fear and respect being, in his mind, as in most Easterns, convertible. The flotilla, then, as it finally appeared ready for sea, consisted of my own houseboat, the "Blue Bird," the cook boat on which the servants lived, and a small craft, half dinghy, half canoe, which did duty as the Admiral's launch and performed such diverse offices as fishing, marketing at the lake-side villages and picking lotus flowers. The first night we ran into a long winding creek, with low, soggy banks and much overgrown with weeds. Patches of market gardens grew on the bits of *terra firma*; the view was closed on most sides by willows and beyond them by the spire-like poplars, so numerous in Kashmir. Back of all, the mountains with their vast ravines, now purple in the fading daylight, made a proscenium for the more gigantic heights behind, which glowed all rosy red from the dying sun. Kingfishers were common as sparrows. They made use of my boat as a look-out; and, as I stood in the bows watching the fading scene before me and listening to the chunk chunk of the paddles of the home-going boats of the fishermen and weed gatherers, I was roused continually by the plock of the birds as with folded wings they shot arrow-like into the stream and fluttered back to their perches with their prey.

They and the lotus flower and the chenár leaf are the common art emblems of Kashmir and are reproduced on most of the carving and embroideries. In autumn the broad-fingered leaves of the giant chenár, taking on their last glories, set all the land aflame.

A great peace deepened down and mosquitoes began to hum. In the little fore-cabin my bearer set the lamp on the table and told me dinner was ready. We were moored near the bank, a long pole driven into the mud holding the boat. A long plank laid on the deck across to a projecting piece of earth made a gangway. The servants' "cook boat" was similarly made fast behind me. It was weird and very lonely when night had at last come down. The pattern of stars in the sky was cut all round by the jagged shapes of mountains, and I thought of the leopards and bears prowling on them in the dark. From time to time, borne across the lake came wild ulula-

tions like the common howl of jackals, but louder and of a more human timbre. They lasted all through the night and later I asked the boatman what they were. It was only small boys who were stationed in the fields, as the corn was now getting ripe, and had to keep up these unearthly yells to scare away the bears and other depredators, and I could not but feel a pity for the poor little rascals, for, though noise is part of a small boy's heaven, if he can make it himself, I doubt if he would love it so well if he had to sit up a tall pole all night and, most likely, go a-reaping all next day. The idea that civilized peoples work hardest is peculiar to civilized people.

I spent a fortnight in this aimless cruising, passing from lake to lake by numerous channels, tying up by night, visiting the old Moghul gardens, sketching, fishing, photographing, a true lotus-eater's life. And there was the lotus coming out in bloom on the lake. I had usually two or three huge blossoms, each as big as a cauliflower, which the boatmen pulled for me and set in old jam jars in my cabin. All day the surface of the lake was animated by canoes darting here and there like fish. Some men were gathering the large plaque-like leaves which floated together like fairy archipelagoes, and I learnt to my surprise that they were gathered to serve as plates for the Maharajah's dining rooms. Others, and many women, squatted on their hams in the bows of their canoes, which they depressed till they were nearly level with the water, and pulled up long strands and trusses of the green clinging weed. My boatmen said it was for cattle fodder. A strange scene it all made, and amidst it tall gaunt water birds, herons and jacanas, often of brilliant colouring, strode about like Japanese screens come to life.

The water was clear, and one could spend hours gazing over the side of the vessel to watch the shoals of fish flashing in and out the subaqueous forests of weed. A great part of the Dal lake is covered with what they call floating gardens, a relic of curious old diversions, again, of the Moghuls. Hence this part of the lake has a sort of false bottom. To all appearance the water is no more than four or five feet deep; but you would get a nasty shock if you stepped overboard, for you would find that what appears to be solid ground covered with grass is only a thin floating crust. It is hard enough for the boatmen to thrust against with their poles as they punt the houseboat over it; but an extra vigorous thrust will go through it. People who live on and around these lakes imagine that they are like the sea. They have, of course, never seen the sea, the nearest point of which is about 1,700 miles away. When you endeavour to tell them of the real ocean and of the ships that plough it, they all but laugh and, at least, smile superiorly like folk who are not so simple as strangers take them to be. The Maharajah's steam launch is to them the most wonderful ship in the world, and they watch it puffing and churning up the rivers with wonderment unabashed.

Much has been written of the beauty of Kashmir women; and, of a truth, many of them might pass as wondrous fair, but for their appalling

incrustation of dirt. I never knew a race of women with greater possibilities of enchantment so marvellously careless of their charms. Either it is ignorance or the stupidity which so often accompanies mere formal beauty of features, but certain it is that they appear to make not the slightest effort towards the enhancement or cultivation of the gifts with which Nature has endowed them. Their complexions often are so fair that they would scarcely arouse suspicion of alien blood if you saw the possessors clad in European garb in a London hotel. With a little more of the tincture of the Orient, they are pink and olive, warmly suffused and graded, with thick blue-black hair. Their features are fine and Caucasian shaped. Passing by the banks in your boat, either through the rabbit warren of Srinagar itself, or in the more open country, you will see often a tall and shapely lass step down to the water edge, pick up her loose blue skirt above her bare brown knees, and squat down to wash out some garment in the stream. Having finished, she laps up two or three handfuls of the muddy brown fluid for a drink. Let the stranger beware; the Kashmiri does not understand the meaning of dirt. As I have said, every Kashmiri that is capable of being poisoned is poisoned young. Those that remain can drink from a sewer with impunity; but the stranger probably cannot.

I used to insist on having my milk boiled and my milk jug scalded with boiling water. One morning I chanced to be standing on the bank. The boat was moored alongside in some particularly foul water which had a nasty scum on it. I saw my cook with my milk jug in his hand, and it had steaming water in it which he was swilling round and round. Mentally I commended him, and was considering whether all servants were such fools as they were painted, when I beheld him throw out the steaming water into the lake, then dip the jug down in the scum over the side of the boat to cool it.

He had obeyed orders, he had scalded the jug, what more could be done!

And one day I said I would go fishing. We were at the time moored among the reeds of the Dal lake, so I stepped into the little *shikara*, I and the boatman, and we paddled off. He vowed he would take me to a place where the biggest and greediest fish in all the lake were wont to congregate. After half an hour across the glassy evening-stilled waters, we came to a fair-sized village, among the houses of which there stood out a great mosque. Parenthetically, I may remark, it was a mosque of some celebrity, for in it was preserved an authentic hair from the beard of the Prophet. It was, therefore, much frequented and, like many holy places, quite likely to lead aspirants to a better land, though rather on account of cholera than from its particular sanctity. In front of this small Mecca was a great floating wooden structure moored out in the lake, and it was here my friend had brought me to fish. It was the public latrine. I discovered the fact just after we had let down our anchor and our lines. Nor could my worthy friend understand my disgust and my hurry to get away from so favoured a locality.

It was the end of the mulberry season, and mulberries swarm in Kashmir. At this season everyone and every animal and bird lives on them. The bears come boldly down from the mountains to feast themselves to repletion with the luscious black berries. The village women go out and bring in basket loads. The deadliest bait in the world for fish is, at this season, a ripe black mulberry on your hook. Kashmir is indeed the land of wild fruits. Later on, the wild apples and apricots come on and again afford feasting to man and beast. A black bear which I shot later on was found to be stuffed with apricots which he had gobbled so fast that most of them were whole in his stomach.

I soon tired of aimless cruising about the Kashmir waterways. I had had the unwisdom to come alone, for I fancied that the freedom with which I could order my movements would more than compensate for the solitude. By this, however, I had tired of talking Urdu to my servants and boatmen and was beginning to long to hear again the sound of my own mother tongue. This could not be yet, so I now prepared to put into execution my grand scheme of shikâr.

In the city of Srinagar I had hired from a native gunsmith a single barrel falling block, .475 high-velocity rifle with a score of soft nosed bullets. It is not considered wise to go after black bear with a single barrel for, obviously, in the all too probable event of a charge, your life hangs entirely on the honesty of the gunmaker's mechanism, and even the trustiest of rifles may jam. I had, however, my double-barrel shot gun, and for this I bought a supply of ball cartridges as well as a few loaded with buck shot. Then I brought my houseboat a two days' journey back across the lake and moored her under some willows by the river mouth. From here it was easy to ascend the river and get into the canals of the city through the great sluice or water gate. We made several trips in the little *shikara* and laid in a quantity of stores. They wanted calculating to a nicety, for where I was going I should find no more. I bought also some *chaplies*, a kind of leather lace-work sandal, into which the foot goes encased in a soft leather sock. These were requisite for myself and shikari, and such servants as might accompany me in the more rugged and difficult areas. All these purchases I made on my own judgment, turning a deaf ear, quite wisely as I discovered later, to the wiles of the agents, bankers, traders and what not of that ilk, who fatten in Srinagar on ignorant voyagers. The most honest of these, for instance, assured me that I should want chaplies for all my coolies, that they always wore them and could not go without them; further, that it was the custom of all sahibs to supply them. He offered to supply them of a cheap grade for rupees six per pair. He was taken aback a little when I explained that I had already myself bought all I required in the bazaar at rupees three a pair for servants, and at rupees five for myself, and that I did not intend to purchase any at all for my coolies. As a fact, I found later on the coolies never wore them, and barely

knew what they were. If they wore any foot gear, which was seldom, it was grass shoes.¹

At last I had all my *bundobust* complete, even to the necessary licence entitling me to slay black bears, leopards, or wild boar *ad lib.*, they being the only beasts in season, as they always are, for their preservation is not considered politic.

One night I anchored in the mouth of the Jhelum River, where it runs with a swift current into the great marsh-like expanse of the Woolar Lake. The lake is dangerous on account of sudden storms which seldom come down till late in the day. Hence the crossing is always undertaken early, and at the first light of dawn we were astir and creeping out with the current, winding our way through the reed beds towards the open water. As the light grew it threw into relief the multifarious ridges of mountains, which came down on all sides into the lake, whilst the intervening nullas remained hidden still in sullen gloom. The surface was still as glass, and the quiet air re-echoed in melancholy music with the quavering calls of water birds. With the regular clunk, clunk of our boatmen's poles we glided on, and the cook boat, drawing alongside, served me in my cabin with my breakfast.

A dozen miles brought us across that part of the lake, and we drew into a semilunar bay, very rugged, with boulders fallen all along the beach from the overtopping crag.

My shikari, whom I had engaged through my head boatman, was a native of the village² which lay near this bay. He was anxious that I should start at once in the neighbourhood where he assured me there were several large bears. I was a little sceptical. I fancied that, like so many of his class, he was anxious to draw his pay and stay at home whilst doing it—so many so-called shikaris set out on shikar without any serious intentions of meeting bears. Indeed, from what my shikari told me afterwards, the last thing they desired to meet was the animal they were going in search of. This attitude lends encouragement to loafers who call themselves shikaris, and lead ignorant Englishmen about the hills in idle pretence of hunting.

We set out for a nulla, which lay round a great shoulder a couple of miles away along the lake shore, and passing through the village and the usual horde of snapping and snarling mongrels which inhabited it, began to climb. Soon we passed the region of fields and entered a long, wide ravine, clad about the sides with a great tangle of jungle, wild canes, raspberry, blackberry, and other low brush, and patches of wild apple trees and apricots. It was about four in the afternoon. The lake lay far below us, a mirror of blue, on which in its far bay lay my boat like a toy ship on a horse pond.

¹ This does not apply to trekking in the more distant and rugged regions such as Baltistan.

² The name of it was Kyunhuns.

We chose a rocky bracket, and there with my rifle across my knees I sat down and waited. My shikari sat beside me with my shot gun loaded with ball between his knees. He was anxious to impress on me his instructions.

"Remember, sahib, after firing, reload at once, don't wait to look; then wait till it is at fifteen paces."

About six o'clock, as the shadows grew long on the hillside, we heard a great crackling of boughs on the other side of the ravine, and saw the foliage of the wild apple trees moving along a certain path. My heart pounded on my ribs, and I softly brought my rifle nearer the ready.

"An old mother bear and cub," whispered my Shikari in my ear. "Remember, sahib, fifteen paces."

We knew it was a she bear with young by the way she kept gritting her teeth, which we could distinctly hear where we sat some seventy yards away. At times she emitted a low, surly grunt, and all the while, with a great rending and crashing, she continued to pull boughs off the apple trees. We had no sight of her, but I observed she was working her way slowly towards a clear path where she would come into view. So I waited in a state of high nervous tension. And then, just as I thought ten minutes more would reward us with a sight of her, a miserable coolie came clattering down the nulla, dragging a long bare pole which he had evidently spent the day in cutting. To scare wild beasts and keep up his own spirits, he was yelling some song at the top of his voice. This finished all chances with the bear, and she was off with her cub like the wind. We heard them smashing through the bushes up the hillside, but could not get a glimpse of them. Only we saw the course they followed by the commotion in the leafage.

Thus ended my first bear hunt.

(To be continued.)



Travel.

ANOTHER BIT OF INDIA.

BY MRS. H. V. BAGSHAWE.

PART I.

AFTER being stationed sixteen weary months at New Cantonments, Delhi, we set forth on the long journey to our new station, Wellington, in the Nilgiri Hills of S. India, without any regrets. As we wished to see something of the east coast we decided to travel via Calcutta and Madras, instead of the more direct route due south.

We left Delhi on a bitterly cold night in February; in spite of big coats and many blankets it did not seem possible to keep out the icy blasts that find their way into an Indian railway carriage which is built for heat and not for cold. When we woke the next morning the temperature was many degrees warmer, and the air much more moist. By 9 a.m. we were at Cawnpore; the scenery had completely changed from that to which we were accustomed in the Punjaub; big trees were growing all around us, mostly mangoes covered with a profusion of beautiful white bloom, and the cultivation was nearly all cotton. Cawnpore is famous for its cotton and woollen manufactories; everywhere one looked one saw huge buildings and chimney stacks which did not improve the landscape.

Allahabad we reached at noon, and soon after crossed the River Jumna; about half a mile down stream on our left we caught a glimpse of the Ganges, for it is here that the two rivers converge. By sunset we were running through fields of opium (a white poppy), and at dusk crossed the Sone River, just outside Patna; the river-bed was over half a mile broad, but at this time of year the actual flow of water is barely fifty yards wide. It took us just twenty minutes to cross, as the train has to go dead slow owing to there being no overhead girders or guards of any description.

We awoke next morning at dawn to find ourselves in the suburbs of Calcutta, in a land of palms, paddy (rice) and water. Here and there we passed factories with their tall chimneys belching forth columns of smoke and wreathing the low-lying country in a thick blue haze. We passed many fine native houses and thousands of miserable hovels that house the majority of the inhabitants of the second city of the Empire.

The air was damp and sticky and the temperature fairly warm. We ran into the terminus Howrah at 6.30 a.m., after a very interesting thirty hours' journey. Kind friends met us and took us to their quarters in Fort William, where we were to stay for our short visit of thirty-six hours in Calcutta. Immediately on leaving Howrah Station we crossed the

famous Hoogli Bridge, across the river of that name. At present this is the only bridge across this river, over which the whole of the traffic entering Calcutta from the west has to pass. It is said that more traffic passes over this bridge in the course of a year than over any other in the world ; if what we saw that morning was a sample, I can well believe it.

The little I saw of Calcutta in the short time I was there did not impress me ; it seemed much like an English city, with the heat, smells, dust and disadvantages of the East thrown in. There were many fine buildings, wide streets planted with avenues of shady trees, excellent English shops, and in the European quarter everything very modern and up to date, but somehow East and West did not seem to blend. One of the finest thoroughfares, Chowringhee, runs beside the Maidan, a fine open space on the left bank of the Hoogli ; on this is situated the race-course, the Victoria Memorial, cricket and football grounds ; and beyond on the river's edge Fort William, which houses practically the whole garrison of Calcutta, only the British Military Hospital being outside its gates at the southernmost end of the Maidan.

The Victoria Memorial is a fine building of white marble-like stone, erected at the instigation of the late Lord Curzon when Viceroy, and houses various collections, whilst immediately beneath the central dome is an imposing statue of Queen Victoria.

At the northern end of the Maidan are the Eden Gardens, beautifully laid out with ornamental waters, flower beds, and flowering shrubs a blaze of colour, and here and there quaint little pagodas and kiosks. Fort William dates from the time of John Company, and is much the same as the others built in India at that period. It has a fine old church within its walls and prettily laid-out gardens. A walk from the fort to the Outram Ghat (landing stage) is interesting ; it reminds one very much of the Thames and the Pool of London, with all its busy craft from all corners of the world loading and unloading their cargoes ; but there seems to be more colour and life than in the Thames, and the surroundings are more picturesque.

There are in Calcutta some very fine Jain (Hindu sect) temples, the finest of their kind in India, I believe, but, alas ! we had not time to visit them. Another show place we missed was the Zoo ; my children went, though, and informed me " it was just as nice as the London one."

The place that interested me most of all was the New Market, in which one could buy anything from curios and clothing to foodstuffs, etc., all at the cheapest possible rate. The fruit, vegetables, meat, etc., were all housed in buildings after the style of Covent Garden and Smithfield, whilst the rest of the market was laid out in arcades, the various trades being housed in different lanes.

After a little more than thirty-six hours in Calcutta we entrained again at Howrah, on the second half of our journey south. We steamed out of the station at 5 p.m., and until nightfall were running through groves of

tall palm trees, fields of paddy, and crossing innumerable small streams and rivers which, in the rosy hues of the setting sun, seemed all colours of the rainbow. The next morning we found ourselves still in the land of palms, but not so dense and of a different variety, and there was practically no water anywhere. Now and then we saw isolated clumps of that beautiful red tree "flame of the forest," and at intervals patches of bright scarlet in the fields, which on closer inspection proved to be red chillies drying in the sun. By this time the temperature was more than warm, and the further south we went the less clothes the natives wore; in fact, all they boasted of now was a loin cloth and an umbrella made from palm leaves. At sunset we crossed the Godavari, another of the holy rivers of India, and shortly afterwards stopped at Rajamundry, the headquarters town of this district. During the night we crossed many other big rivers, one of which was the Kistna, but it was too dark to see more than the barest outline. We ran into the terminus at Madras about 8.30 a.m. the next morning, the last few hours of our journey being through the swampy creeks and inlets that run up from the sea; we got occasional glimpses of the coast fringed with palms, the sun glistening on the sea beyond.

We were only to stay a day in Madras, and again kind friends put us up. Their quarters were in Fort George, another old John Company fort on the edge of the sea. The various barracks and quarters contain much beautiful old woodwork, and there is an old Protestant church which is said to be the first Christian church built in India, which is very interesting. Madras is a very picturesque city, well laid out with broad and shady roads, magnificent modern buildings, nearly all of Eastern design, a fine sea front and marine drive. I found Madras a most attractive place, the attraction lying, I think, in the fact that, although it was modern and up to date, it did not lose its oriental aspect and remained everywhere very picturesque. The Aquarium is well worth a visit, as it houses many weird and curious denizens of the deep. The Victoria Institute of Arts and Crafts should not be missed, as it gives one a first-class insight into the varied trades and crafts of the Madras Presidency. The British Military Hospital is situated at the southernmost end of the fort, facing the sea; from the outside it appeared very small, which I believe it is; it has no sisters, and the families have to go into the Government General Hospital when sick.

We left Madras that night at 8 p.m., on the final stage of our journey. We saw nothing of the country through which we were passing until dawn the next morning, when we arrived at Podanor, the junction for the West Coast and Nilgiri Hills. The country round us looked bare and dry, very few trees, and nothing green; in the far distance we could discern a range of deep blue mountains, which we took to be the Nilgiris; the nearer we got to them the bluer they became, hence their name, nil (blue), giri (mountain).

We reached Mettupallyam, the terminus of the broad-gauge line, about

8.30 a.m. ; here we had to change into the narrow-gauge mountain railway that was to take us up to our destination. The first two miles to the little village of Kallar is flat, through dense palm groves ; then the engine that had been pulling us retired to the rear of the train, and from thence onwards proceeded to push us upwards with the assistance of a rack. The planning and building of this line must have been a difficult task ; in some places it is cut out of sheer rock, with a drop below of some thousands of feet. The gradients are severe, hence the use of the rack. I noticed in some parts the gradient marked on posts at the side of the line was as much as one in fifteen. As the train climbs over 6,000 feet in less than eighteen miles it is not surprising. The scenery is very fine ; one looks across a deep and thickly-wooded valley to a sinister looking peak at the end of a long spur which is called the Droog. Through openings in the jungle below one gets glimpses of the Kalla River tumbling down steep falls in mad haste to join the Bvani River in the plains below. At an altitude of about 4,000 feet one runs into the coffee and tea estates ; the various bungalows and factories are dotted about on the hillside above one. Just before turning into the inner valleys one gets a fine view of the valley and the plains beyond ; at sunset this view is really beautiful ; the hills are blue, the valleys green, and the plains beyond a lovely shade of deep pinky red. The first station one reaches is Coonoor, a very popular summer health resort, two miles from Wellington. From the railway station Coonoor is most unattractive-looking, as one only sees the native quarter and bazaars, which, like elsewhere in India, are ramshackle and dirty. The residential quarter is above on the top of the hill and quite out of sight. As the train stops three-quarters of an hour here to allow the passengers to have breakfast, a friend came to meet us and motored us straight up to Wellington, by a pretty road running above but almost parallel with the railway line ; our luggage we collected later from Wellington station.

There was no house available for us in Wellington, so we had to take one in Coonoor, and it was not until six months later that we were able to get one in our proper station and settle down there. Our journey from Delhi took us exactly a week ; every moment of it was full of interest and we all thoroughly enjoyed it. In spite of the cares of a family and a pet cat, we arrived safely after a very pleasant little trip half way round India.

PART II.

The Nilgiri Hills, though not so grand as the Himalayas, are prettier and the climate is more equable. Wellington is situated at an altitude of 6,000 feet above sea level, on a long open spur running down from the central range, the highest point of which is Dodabetta (8,500 feet), the highest point in the Nilgiris. The native bazaar is at the bottom of the valley through which the railway runs. The barracks and hospital are on

one side of the spur and the private bungalows on the other. Like Coonoor the approach from the station is not prepossessing; one sees only the ugly native hovels, and still more ugly barracks, but directly one gets on the top of the hill one comes to shady roads and pretty bungalows, with gardens a blaze of flowers. Wellington was for some years the headquarters of the Madras District Staff, but in September, 1926, they moved to Bangalore, where they had been previous to the Great War. The garrison consists of one battalion of infantry (British), a company of which is away on detachment at Mallapuram in the Moplah country. It seems a great pity that more troops are not stationed in this perfect climate, and where the cost of living is low, rents ditto, servants cheap, and the sick-rate practically nil. Although I have mentioned a bazaar, there is really no such place, at least not what one is accustomed to elsewhere in India, where one's cook can go daily and procure supplies. In all the Nilgiri towns it is the custom to hold a weekly "shandy," or market, from which one lays in a week's supply of fruit and vegetables, and at which one buys the best meat, that which is slaughtered during the rest of the week being generally of inferior quality. The gaily clad men and women squatting in front of their goods in the market place are very picturesque, if not exactly clean, and one sees such a varied collection of tropical and English produce, rhubarb and Brussels sprouts, next to coconuts and brinjals, mangoes and strawberries, tomatoes and celery; every kind of fruit and vegetable seems to flourish in the Nilgiris. My only grouse is the inferiority of the servants; they are all Christians, very lazy and unreliable. I tried many and found only one worth thinking about; anyhow, the supply is bigger than the demand, so one can always go on trying and hoping for the best. I think I am right in saying this is a general grouse everywhere—especially by people coming from the north, where all servants are generally excellent.

Wellington has a charming little gymkhana club, situated in an amphitheatre half way to Coonoor. The club-house is in the centre, and round it the race-course, whilst an excellent little golf-course crosses it; there are also several good gravel tennis courts. The greens of the golf-course are real greens, which is unusual in India, and the whole course is kept in excellent condition, and voted by many of the enthusiasts of the game one of the best courses in India. In fact, the whole club is well run, which is due to a very capable and more or less permanent hon. secretary who takes the greatest interest in the whole show.

Excellent big game shooting of every variety, from elephant and tiger to much smaller species, may be had within a hundred miles of Wellington. Small game is not so plentiful and more difficult to get. Fifteen to twenty miles away, on the Ootacamund Downs, there is very good trout fishing. These downs are also the home of the famous Ooty Hunt.

The biggest civil station in the Nilgiris is Ootacamund, ten miles west of Wellington by road or rail, and another 1,500 feet higher. Ooty (local abbreviation) is situated in a basin in the hills, the bigger and nicer

private bungalows clustering high up on the surrounding hills. It is much greener than Wellington and frightfully overgrown with enormous blue gum or eucalyptus trees, originally imported from Australia many years ago. A stream that used to run through the valley in Ooty has been dammed up, forming a very picturesque lake; sloping lawns run down to the water's edge, and dotted here and there along the banks are graceful firs and flowering shrubs, whilst arum lilies and other water-loving plants are to be seen in or on the water everywhere. Looking across the lake one cannot

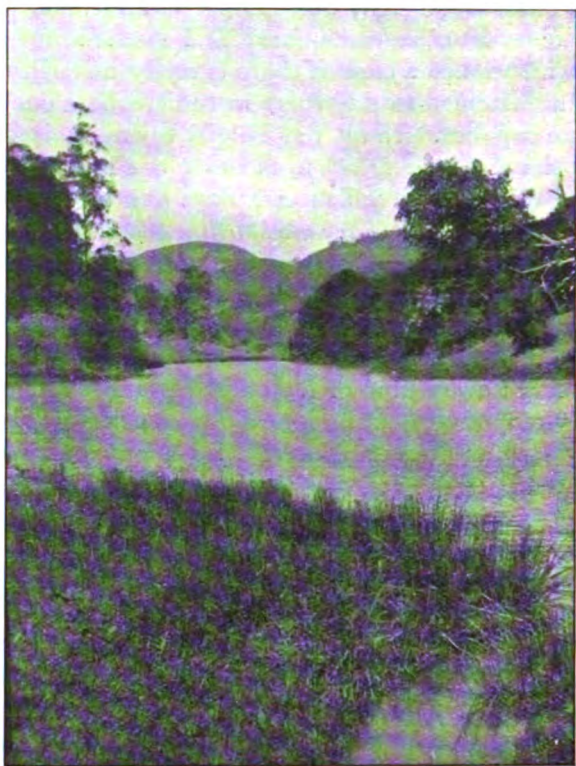


FIG. 1.—Lovedale Lake, Ootacamund.

believe one is in India, it reminds one so much of Virginia Water at home. Ooty is everywhere an extraordinary mixture of tropical and English growth; one finds arum lilies and lotus growing alongside gorse and broom, whilst not far off there is a dense jungle of bamboo, moonflower (the deadly datura), tree-ferns and palms. Ooty has a pretty little race-course on which races are held for a week every May. The famous Downs commence about three miles out of Ooty, and remind one very much of Sussex; they are perhaps a little steeper. The valleys are thickly wooded and provide fine covert for the many jackal that give the Hunt their sport.

Alas! these "sholas" (woods) also harbour sambur and pig, which so often lead the hounds astray and give the Hunt officials many a bad half-hour.

There are some very fine rivers running across the Downs, in which trout are caught. The Mukerti, Krumund, Billithadhulla, Avalanche, Emerald, Pykara, and Kundah, the three former being considered the best. Nowadays really big fish are not caught, the rivers being overstocked. Last year we had excellent fishing every time we went out, but this year, with the exception of on the Billithadhulla, we had poor sport. Five days on Billithadhulla brought two rods in a total of 227 fish, which is not to be despised.

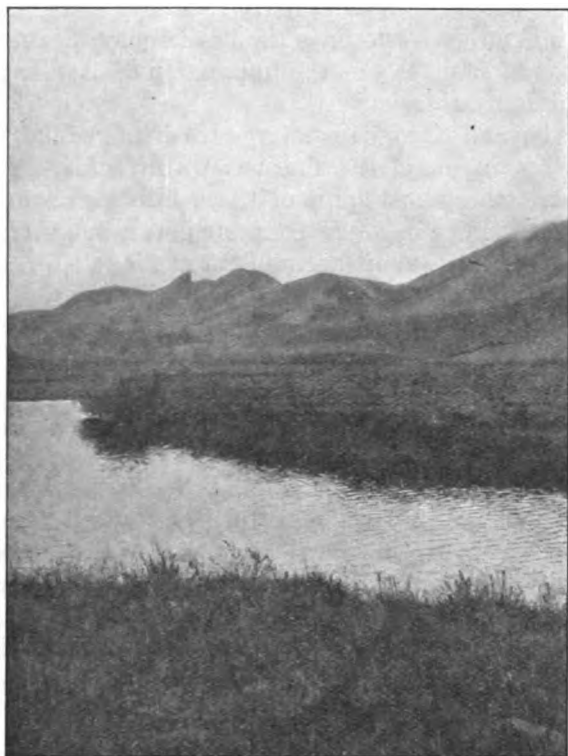


FIG. 2.—Mukerti Peak and Mukerti River.

Ooty, like Wellington, has an excellent golf-course, but the greens are "browns" and crows devour one's balls. There is also a big club in Ooty itself, whilst the club-house on the golf course takes the place of the gymkhana in other places.

The next biggest station after Ootacamund is Coonoor, a very pretty spot on the edge of the hills and commanding fine views of the plain and outlying ranges.

In the most central valley of Coonoor is Sims Park, laid out as public

gardens, with green lawns dotted here and there with flowering shrubs and trees. The lawns slope down to a pretty lake at the bottom of the valley, in which grow water-lilies, lotus and other aquatic plants. Just above these gardens is the Pasteur Institute, the only one in Southern India.

There are many pretty drives and favourite picnic spots within a short distance of Coonoor and Wellington. Lambs Rock and Lady Canning's seat on the edge of a mighty precipice, dropping sheer over to the plains beneath. And a drive to the Droog is not without interest, as it provides a different outlook over the plains to the other two places mentioned.

There is one other small station in the Nilgiris, and that is Kotagiri, eleven miles due north of Wellington. A sleepy little place, situated on an open slope, and supposed to have the best climate in the Nilgiris. The little I have seen of it gives one the impression of it being half dead, and very dull and uninteresting.

Seven miles beyond Kotagiri is a large tea estate called Kodanaad, from which one may obtain one of the finest views in India. The tea gardens slope down the northernmost spurs of these hills for about 2,000 feet, and from a rocky promontory beyond them one gets a magnificent view of the plains and Mysore Plateau, in a complete semicircle, in some places for over a hundred miles. The country beneath one stands out like an immense map in relief; to the far west one sees the hills of the Wynaad, then a little further north-west the city of Mysore, with the famous sacred Chamundi Hill standing out clearly by itself in the middle of the distant plains. Immediately opposite, across the valley of the Moyar River, are the Billigirirangaans, which are nearly as high as the Nilgiris, and stretching away to one's right, due east, is Salem and the surrounding plains through which the amalgamated Moyar and Bvani Rivers wend their way. On one occasion, when I was at Kodanaad, the manager of the estate kindly offered to take us over the tea factory and explain the process of making the tea. A most interesting day; we saw the whole business from the time of picking until the leaf was packed in familiar lead packets ready for export. It is too lengthy a tale to go into now, but I strongly recommend anyone on a visit to the Nilgiris to try and get permission to go over a tea factory; it is well worth a visit.

The Nilgiris are plentifully supplied with many first-class roads in all directions, consequently everyone has motors; in fact, I really do not think one could exist without one, as distances are so great. There are so many charming spots to visit, both near and far. One of the prettiest trips is round the northern slopes of Doda Betta, and home by Ooty. A walk of about three miles from the road takes one up to the very highest point, where there are the ruins of an old observatory. From the top of this one gets a wonderful view in a complete circle, the Nilgiris standing up like a huge island, the sea being the plains all round.

There are numerous pretty spots all over the Downs, the most favourite

I think, being the banks of the Pykara River. Then there is the Katteri Lake, six miles south of Wellington; the lake was formed by damming up a small river where it dropped sharply down to the valley of Kullakumbay below. The actual dam wall is built across the edge of the waterfall, and from here one gets another lovely view of the valleys below, nearly all under tea cultivation, and of the far distant range of the Animali Hills.

The climate of the Nilgiris is perfect, never very hot and never very cold. The rains are fairly heavy, but there is always sunshine at intervals. Ooty gets the full force of the south-west monsoon, Wellington and Coonoor only getting the tail end, but with the coming of the north-east

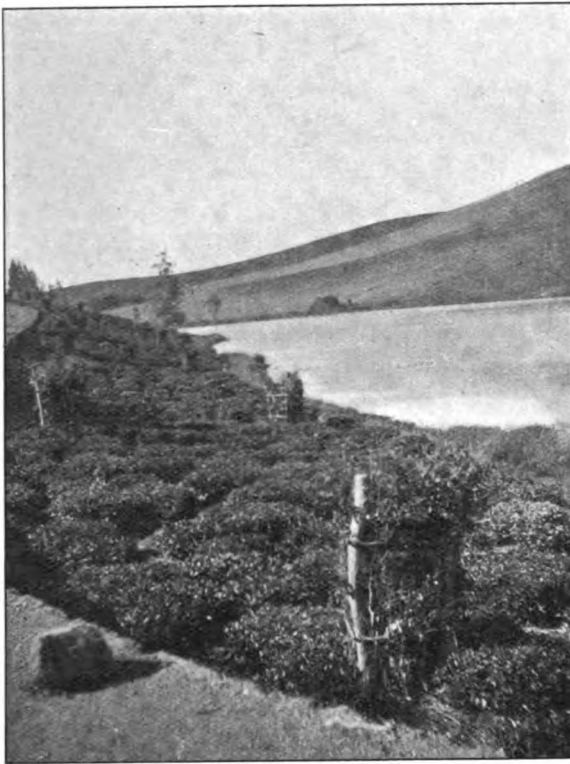


FIG. 3.—On the Kodanaad Tea Estate.

monsoon the order is reversed, Ooty only getting a fraction. From December to May, the so-called winter months, there is bright sunshine and blue skies every day; the days are hot enough for thin frocks, but the evenings are such a contrast that one is glad to don thick woollies after sunset and have big fires and many blankets at night. Gardens are wonderful, things absolutely ramp; so much rain and so much sunshine act like a hot-house, and things grow in the night. I have made twenty-three gardens in four continents, but never anywhere have I seen both

flowers and vegetables grow like they do in the Nilgiris. It is almost impossible to kill things, prune and cut as much as you will ; cuttings jammed into the earth anyhow root, and seeds come up in the night, so to speak ! All over the Nilgiris one meets retired military and civilian officers, glad to end their days in such a beautiful spot and in such a perfect climate. They all seem to live to a great old age, which speaks well for the country in which they live.

Surely there can be few people who have had the luck to be stationed in the Nilgiris who have anything bad to say of them, like of most stations



FIG. 4.—Pykara Falls, Nilgiris.

in India, where everyone can find something to grouse at. I have met a few but I think they must be of the kind who are never happy anywhere. Personally, we never hope to be in a more delightful spot or in a more perfect climate ; we should be perfectly happy to spend the rest of our lives here, let alone the rest of our tour, but, alas ! family ties call us home to England. We have been travelling for over twenty years, and it is the first time we have not had the slightest inclination to move on to "a better station" ! I do not think there is one in India, and possibly not in the British Empire ; anyhow, not under the jurisdiction of the War Office.

Current Literature.

NUTT, MURIEL M. **The Method of Division of the Rough and Smooth Type of Colonies among the Bacilli of the Salmonella Group.** *J. of Hyg.* 1927, v. 26, 44-8, 8 figs. [13 refs.]

This paper records a series of observations on the mode of division of 'rough' and 'smooth' strains of *Bact. aertrycke* (Mutton) and of allied organisms. Starting from single bacilli, the subsequent growth and division was watched by dark-ground illumination, using a thin layer of agar between a slide and a cover-slip. It was found that the two varieties of each species examined showed characteristic differences in their mode of growth. The 'smooth' forms show the normal slipping motion after each division, the daughter cells sliding past one another and coming to lie side by side. In the 'rough' forms the bacilli appear to remain adherent for some time after the dividing constriction is complete. Thus short chains of cells are formed, adherent end-to-end. After one or two divisions, there is a marked tendency for sharp bends to occur at the intercellular divisions, contiguous cells coming to lie in an acute or obtuse angle to one another, In this way a characteristic grouping is formed, which enables an observer to identify a 'rough' strain very early in its growth. This method of division is not constant and typical for every individual of a 'rough' culture; but it is always a marked feature when many dividing bacilli are observed, and it is never seen in a 'smooth' strain.

W. W. C. TOPLEY.

Reprinted from "Bulletin of Hygiene," Vol. 2, No. 10.

MONIER-WILLIAMS, G. W. **The Determination of Sulphur Dioxide in Foods.** *Ministry of Health. Reports on Pub. Health & Med. Subjects.* No. 43. 56 pp. 1927. London: H.M.S.O. [1s. 3d.]

Under the Public Health (Preservatives in Food) Regulations, 1925, sulphur dioxide is permitted to be used as a preservative in certain foods and drinks. For this reason a review has been prepared of the existing methods for the determination of sulphurous acid in foods. All the sulphurous acid does not exist in the free state, some entering into combination with aldehydes and sugars forming hydroxy-sulphonic acids which have no antiseptic action. These compounds are resistant to oxidation and they have to be decomposed by the addition of alkali or acid before determination of the sulphurous acid. In the Regulations no distinction is

made between free and combined sulphurous acid, the total acid only having to be taken into account.

A qualitative test for the detection of sulphurous acid is the decoloration of iodine with formation of sulphuric acid. About 10 gm. of the food is mixed with water in a flask, dilute hydrochloric acid and marble added, and the mouth of the flask closed with a stopper carrying a bent thistle funnel containing a few drops of centinormal iodine and a little barium chloride solution. After the flask is filled with carbon dioxide, it is brought to the boil, and any sulphur dioxide evolved decolorizes the iodine and produces an opalescence or a precipitate in the barium chloride.

For the quantitative determination, the separation of sulphur dioxide from the foodstuff by distillation is the method of most general application. The distillation is conducted in a current of carbon dioxide and the food is acidified with phosphoric acid or hydrochloric acid. For the determination of the sulphurous acid in the distillate, either titration with iodine and thiosulphate may be employed, or sulphuric acid is formed by oxidation with hydrogen peroxide and is precipitated with barium chloride.

Various alternative methods with their advantages and disadvantages are discussed, and the author describes a method he has devised on the foregoing principles. For a drawing of the apparatus and other details, the original must be consulted.

The advantages of the method are that errors due to sulphuretted hydrogen and volatile organic sulphur compounds are eliminated, and volatile acids do not pass over into the distillate and interfere with the titration.

The amount of sulphurous acid in foods decreases in keeping, the rate of decrease under the same conditions varying greatly with different foods.

J. H. JOHNSTON.

Reprinted from "Bulletin of Hygiene," Vol. 2, No. 1.

BLEYER, B. Chemische Bemerkungen ueber Kohlehydrate der künstlichen Säuglingsnahrung. [**Notes on the Chemistry of Carbohydrates used for Artificial Infant Feeding.**] *Muench. Med. Woch.* 1927, v, 74, 765-7.

The chemical processes involved in the breaking down of starch have been studied intensively during the past few years. There is evidence that the starch grain consists of two types of polymerized carbohydrate, amylose contained in the centre of the grain, and amylopectin surrounding it. Under ordinary conditions amylose breaks down more readily than amylopectin, which latter forms the so-called dextrans. By suitable adjustment of the conditions, starch can be "malted" in such a way that both the amylose and the amylopectin may be broken down almost simultaneously to maltose and glucose, without the formation of any appreciable quantity of dextrin. The dried product thus obtained is very easily soluble, is not

hygroscopic and is sweet to the taste. It has been put on the market under the name "Kinderzucker."

S. J. COWELL.

Reprinted from "Bulletin of Hygiene," Vol. 2, No. 10.

VAN DER BOGERT, F. **Sweet Eating—its History and Effects.** *Hospital Social Service.* 1927, v. 15, 324-34.

Sweet eating is a new social habit and even the eating of sugar in large amounts is a comparatively new feature in civilized communities. In A.D. 1700 the total consumption of sugar in Great Britain was about 10,000 tons; the 1922 estimate reached 21½ million tons. Great Britain showed the greatest pre-war consumption of sugar in the world, but the United States now leads with a per capita annual consumption in the region of 100 pounds. Prohibition probably accounted for the great increase in sugar consumption in the United States. Over 148 million gallons of ice-cream were produced in the United States in 1922; many breweries have been converted into factories for the production of candy, ice-cream and syrup. These facts point to habit rather than necessity as the essential cause in the great increase of that most pernicious of all dietetic habits, eating between meals. Monkeys in the wild state prefer acid fruits, but in captivity soon become confirmed sweet eaters.

There can be no question as to the value of carbohydrate in the diet and even a moderate amount of sugar, but there is no proof that after infancy sugar is essential, whilst there is every reason to believe that the process of conversion of starch into sugar is of benefit to the development and maintenance of the digestive processes. Sugar is of real use in the diet of infants, and adults occupied in outdoor work or under conditions of great physical strain, e.g., lumbermen, athletes, polar explorers. After infancy the addition of sugar to the diet has no effect in improving nutrition. Experience in children's institutions has shown that the more regular diet times and absence of excessive sweet eating produce superior conditions of nutrition in these children.

The "natural" craving for sweets in children is no more natural than the craving for alcohol. Craving can only be relied upon as an index of body needs when man reverts to his natural state. Dietetic errors are the cause of the gastro-intestinal disorders so common in children, and most of the functional nervous disorders of children can be traced to toxæmia of intestinal origin. The most frequent dietetic error of childhood is carbohydrate excess, usually due to the eating of sweets. There can be little question as to the influence of sweet eating on dental decay. The teeth are probably affected in three ways by sugar excess: lack of proper mastication; bacterial growth in the mouth is favoured by sugar; gastro-intestinal derangement interferes with the absorption of bone-forming substances. The author believes that adenoids and hypertrophied

tonsils are indirectly due to carbohydrate excess, and that recurrences after operation can be prevented by elimination or limitation of sweets in the diet. There is much evidence as to the racial distribution of adenoids and the nature of the diet. Labrador Eskimos, and those of Baffin Land who have been in contact with the whites for long periods, develop adenoids, whilst Polar Eskimos, whose diet has remained unchanged for centuries, do not.

The popular knowledge of calorie values has a bad effect; our ancestors were safeguarded by their ignorance. How much better to advocate "temperance in all things" than prohibition in one.

H. N. H. GREEN.

Reprinted from "Bulletin of Hygiene," Vol. 2, No. 10.

PASCHEN, E. Ueber zweitägige Vakzine. [**Two-Day Vaccine Lymph.**] *Deut. Med. Woch.* 1926, v. 52, 3 pp., 4 figs.

After recapitulating the usual methods of obtaining vaccine lymph, Professor Paschen, writing from the Government Lymph Establishment of Hamburg, reports that he sought a more expeditious method of obtaining potent material. Accordingly he scraped the vaccinated area of a calf at about the 48th hour after inoculation, instead of at about the 120th hour, and obtained a fluid very rich in the necessary active elements. This two-day vaccine is described as slightly opaque, containing hardly any detritus, but few concomitant organisms, and those few easy to get rid of. Ample dilution is necessary. For children a dilution of 1 in 25 to 1 in 1,000 was employed, with unexceptional results. There are given illustrations to show the results of vaccination with each of these strengths. Paschen claims that in effect and in economy of preparation this method of obtaining vaccine lymph has advantages over that in ordinary use.

W. MCC. WANKLYN.

Reprinted from "Bulletin of Hygiene," Vol. 2, No. 10.

Reviews.

A SHORTER SURGERY. By R. J. McNeill Love, M.B., M.S.Lond., F.R.C.S. Eng. London: H. K. Lewis and Co., Ltd. 1926. Pp. viii + 298. Price 12s. 6d.

"A Shorter Surgery," by Mr. R. J. McNeill Love, is a small volume of less than 300 pages, which has been written by the author with special regard for the needs of practitioners and students studying for the higher surgical examinations.

The book presents in a clear and concise form the essential points, with regard to diagnosis and treatment, of advanced surgery to-day.

It is a valuable supplement to the larger surgical textbooks in common

use, for the student is apt to be confused by the volume and complexity of the surgical knowledge he is expected to acquire from lectures and books.

The first five chapters are devoted to the following subjects : Tumours, bones, joints, deformities and nerves ; while the Chapters VI to XXV are allotted to definite anatomical regions of the body.

In the chapter dealing with bones, several very good illustrations of various pathological conditions are given, and the diseased conditions are well described.

With regard to fractures, however, only the general principles of treatment are indicated, and it is considered that this branch of surgery might with advantage have received fuller attention, in view of the frequency of accidents in our mechanical age.

The same criticism is applicable to the subject of joint injuries.

The diseases of joints are very well dealt with, all the important pathological conditions being fully described.

In the limited space of one chapter the author describes all the common deformities met with, and enables the reader to revise his knowledge of this subject in a very short space of time.

The surgery of the skull is dealt with under three main subdivisions. (1) Fractures of the vault and base ; (2) intracranial hæmorrhage ; (3) intracranial suppuration.

The operative technique required for the relief of various intracranial conditions is well and clearly indicated.

The chapter devoted to the tongue describes briefly the various inflammatory conditions which affect this organ, while the treatment of cancer receives full attention, together with the rôle of diathermy in the treatment of this disease.

In connexion with the neck, a very good condensed description of the various cysts, tumours and pathological conditions met with in this area is given. The frequency with which these affections are met with in the examination-room makes this chapter a very useful one to the student.

In the surgery of the stomach very good descriptions are given of the standard surgical procedures, but the author's opinion that the diagnosis of a gastric ulcer necessitates the performance of a gastro-jejunostomy operation will not be endorsed by all.

Many medical men recommend for these cases at any rate a preliminary course of medical treatment, provided no signs of organic obstruction are present.

The affections of the liver, gall-bladder, pancreas and spleen requiring surgical treatment are all taken in detail, and are described with sufficient fulness for anyone undertaking a revisionary course prior to sitting for an examination.

As every part of the body is dealt with separately, the practising surgeon and the student of advanced surgery will find in this work a very useful guide. The surgeon will be able to refresh his knowledge on essential

points when dealing with an unusual case in his practice, and at the same time note the latest form of appropriate treatment.

The small size of the book will especially appeal to the student, for when travelling to or from his college, short periods of time for reading occur, when the textbooks of surgery are not available.

As a means of rapidly revising one's knowledge, in practically the whole field of surgery, this book will be found invaluable.

C. C.

SURGICAL APPLIED ANATOMY. By Treves and Choyce. London: Cassell and Co., Ltd. English edition. 1926. Pp. x + 727. Price 14s. net.

An accurate knowledge of anatomy is a true foundation for the surgeon and clinician, and in this well-known book to which we turned in our student days we may with great advantage apply ourselves when the memory of the dissecting room is growing a little grey.

The small volume is well stored with useful information in every branch of surgery and explains simply and briefly many important facts which are essential aids to diagnosis and treatment.

Many abdominal operations are shortly described, and in other cases the salient points of operations are alluded to.

The volume is an invaluable one for reference, and its small size enables it to be carried with ease. The information is thoroughly up to date in all details and is illustrated with 162 figures including 66 in colour.

HERNIA AND HERNIOPLASTY. By E. M. Cowell, D.S.O., M.D., F.R.C.S.Eng. London: H. K. Lewis and Co., Ltd. Demy 8vo. Pp. xvi. + 128, 72 illustrations, with 8 plates. Price 9s. net.

The author has succeeded in producing a work which is short and concise, and which the more experienced as well as the young surgeon might read with advantage.

The illustrations, which are very numerous, are for the most part excellent, but we think it a pity that the steps of the author's operation are illustrated by photographs rather than diagrammatically.

The description of the operation is, however, so good that illustrations are actually unnecessary. The idea of summarizing the contents of each chapter at the end is good.

C. H. T.

ETHYL CHLORIDE: ITS SCOPE AND METHODS OF ADMINISTRATION AS A GENERAL ANÆSTHETIC. By Charles T. W. Hirsch, M.R.C.S.Eng., L.R.C.P. London: John Bale, Sons and Danielsson, Ltd. 1927. Pp. vi + 32. Price 1s.

The author is an enthusiast in the use of ethyl chloride, and has written a clear and readable exposition of its uses. He rightly stresses the rapidity of its action, and the necessity for the anæsthetist to be on the alert during

the whole period of its administration, and mentions a fact often forgotten, that ethyl chloride anæsthesia is apt to deepen after the cessation of the administration as a result of the continued absorption of the vapour from the lower air passage.

He divides its uses into : (1) for short operations ; (2) as an inducing agent, followed by ether or chloroform ; (3) for maintaining anæsthesia for prolonged periods, without the use of any other anæsthetic.

Ethyl chloride is unsuitable for prolonged administration, and although the author does not favour this procedure, he occupies considerable space in describing the method.

For anæsthesia by the open method, as much as twelve to fifteen cubic centimetres is stated to be necessary. This amount is apt to convey the impression to the novice that these large doses can usually be employed with safety.

L. M. R.

PRINCIPLES AND PRACTICE OF MOSQUITO CONTROL : Being a Handbook to the British Mosquito Control Institute. By John F. Marshall, M.A., F.L.S., F.E.S., Hayling Island, Hampshire. Pp. viii + 38, with five appendices and 53 original illustrations. 1927. Price 2s. 6d.

This small book, in addition to giving the history and origin of the British Mosquito Control Institute at Hayling Island, Hampshire, also contains very useful information on the methods to be employed when destroying the mosquito in its various stages of development.

The book should be read, not only by medical officers, but also by the general public, as it shows clearly that mosquito control can be carried out by all classes of the community.

The writer lays stress on the fact that engineering work is much more satisfactory than the use of larvicides in the elimination of mosquitoes, but, as in all such schemes, the work can only be carried out when ample funds are available.

The appendices are most useful and refer to : (a) wing venation of mosquitoes ; (b) classification of the British mosquitoes ; (c) formulæ relating to "oiling" and "larviciding" ; (d) mosquitoes and the Public Health Act ; (e) transmission of glass, liquids, etc., by post. The illustrations are clear and well produced.

J. E. M. B.

Correspondence.

MOSQUITO-PROOFING BARRACKS OF BRITISH TROOPS IN INDIA.

TO THE EDITOR OF "THE JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

DEAR SIR,—As A.D.M.S. Lahore District in 1924-26 I was pleased to see Major Campbell Munro's article in the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS for October, dealing as it does with a very interesting period. On my arrival at Lahore in early November, 1924, I was met with the situation as described by Major Munro. The British Infantry Battalion at Lahore had been in the Station for three years and was in a very bad state of health. I remember that shortly after my arrival at that Station, the D.M.S., Major-General O. L. Robinson, C.B., C.M.G., paid us a visit and himself inspected the Infantry Battalion on parade; out of a strength of 650 there were 60 in hospital, 80 at the Malaria Treatment Centre, Kasauli, and 160 attending for post-malarial treatment at the Medical Inspection Room; and of the remainder, many men were recovering from their previous attacks and were anæmic and debilitated; at the parade several men had to be sent away as they were obviously in the early stages of another relapse. The situation at Amritsar was even worse, the British Infantry Company showing an admission rate of 1,172 per 1,000.

Much work has been done, and was done every year in the antimalaria campaign, with somewhat depressing results. At my first visit to Amritsar I inspected the fort and was surprised to find that the British soldiers, only a few in number, gunners of a strength of about twenty, were singularly free from malaria in comparison with their comrades of the infantry in cantonments some few miles away. The fort looked an ideal breeding place for mosquitoes; it is surrounded by a moat, and in close proximity are shallow ponds, well trampled round the edges by cattle. Also the fort is near the town, containing a teeming native population. Anopheline larvæ were found to breed in the moat. Somebody, at some time, had fly-proofed or mosquito-proofed the actual barrack rooms the British troops used in the fort and also the dining rooms and canteens. I never could ascertain when this was done. The gauze used was a bigger mesh, I should say about eighteen or twenty to the inch, and in accordance with modern teaching, rather too big to exclude anopheline mosquitoes. However, I am not at all certain that the mosquito will push or bore through a wire gauze mesh as he is reported to do through an ordinary mosquito net. At any rate, there was the wire gauze, and the men said they were not bothered by mosquitoes in the barrack-rooms. I used this as a proposition in support of the proposals we put forward for sanction to attempt an extended programme of proofing at Amritsar, and the barracks and hospital were completed in December, 1925. The fumigation of the barracks was carefully done by Captain McGorty, M.C., who was in medical charge of the Station; incidentally the photograph produced in Major Munro's article was taken by him and is a view of the British Military Hospital, a building

whose general architecture is similar to that of the barracks. I visited Amritsar during the hot weather of 1926, and could not find mosquitoes in the barracks or hospital. I always adopted the method of making for the darkest corner and disturbing it with a stick to stir out any mosquitoes, and I compared conditions at Amritsar with those in 1925, when I had a lively recollection of finding the V.D. treatment room, which was a particularly dark room, buzzing with mosquitoes; so much so that I asked the medical officer to put in a trap for identification purposes. In 1926 I could not find any mosquitoes. I do not wish to convey the impression that mosquito-proofing is "fool-proof" and can exclude any mosquito, but the more I saw of it, the more I was convinced that the mosquito is not such a persistent insect as we think in his search for food, and it is not a case of swarms of them flying round and round the building trying to get in at any possible crevice. However, to illustrate the want of "fool-proofness," on questioning a corporal in a barrack-room, I asked him was he ever bitten, and he replied, "Yes! I have been just lately, and I know why." On further questioning, he offered at once to show me, and he did; just outside one of the proofed bays was a chatti, and at the top of the verandah bay there was a tear in the netting that had not yet been patched; on looking into the chatti I found two or three inches of water at the bottom of the vessel simply solid with larvæ! On the whole I was most agreeably impressed by the care the men took of the gauze wire both at Amritsar and at Lahore, and I am quite sure that the men appreciated what had been done. I frequently questioned N.C.O.'s and men at Amritsar and Lahore and never got a "grouch" against the proofing. The situation can be summed up in: (1) Relief at not having to use a mosquito net; (2) electric punkahs could be lowered to swing just above their bodies; (3) absence of flies and other pests.

The actual proofing was carried out by the R. E. (the C.R.E., Lieutenant-Colonel Goodwin, D.S.O., took a great interest in the work and was of great assistance to us). The opinion expressed by many that the plan described by Major Munro would make the barrack-rooms intolerably stuffy and hot by excluding air, was not supported by the troops; in fact I was often told that the burning winds of the hot weather before the monsoon broke were not felt so much in the proofed rooms; I suppose on the same principle as shutting up one's own bungalow excludes heat. In the 1926 hot weather I made some late afternoon visits to barracks at Lahore and then to unproofed lines as a contrast. One could not help being very much impressed by the difference; in the lines (proofed) I went to all the fire-places and tried to stir mosquitoes out of them; one knows what happens in one's own bungalow if you put a stick up the chimney, one gets a cloud of mosquitoes out of such places, but in the proofed lines I could not get any, as in these particular barracks the chimneys were sealed up at the top by a specially designed wire-gauze cap that clamped on the chimney exit. The choice of gauze is most important. We took our ideas from all the available literature on the subject published with reference to the work done

in the Panama Canal zone, and asked for a sixteenth-inch mesh rust-proof, brass, wire gauze; but in the Military Station Hospital at Lahore and the barracks at Amritsar we had to use a stock that was available in R.E. parks of too delicate a consistency, being very light and springy, which though protected by rabbit netting was much too easily torn, whereas later on when the Napier lines were done the gauze was stronger and much more satisfactory. It always struck me as somewhat extraordinary that mosquito-proofing of barracks had not been attempted in India, so many points seemed to indicate that it would be successful. In Lahore itself the Mayo Hospital wards are protected and many of the private bungalows also, though the system of doing it is not so complete as that now adopted in barracks, yet the inhabitants are freer from malaria than our troops. Everything at Lahore seemed to point to "personal protection" as against extensive antimalaria work, which is complicated by the invariable question of cantonment boundaries, as work done inside cantonments can be so easily negated by conditions outside. Not that antilarva work can be ignored because of increased personal protection. I am convinced that the combination of both measures is the ideal, as has been found in the Panama zone. A great amount of work was done at Lahore in the malaria season of 1925 to 1926, and many practical results were obtained. The cantonment contained many disused wells not now necessary as the water is a good pipe supply; a campaign against unused wells was carried out and the R.E. sealed them up with concrete tops. Dhobi ghats were energetically dealt with, a very interesting result was that those with a piped water supply used the old well as a drainage sump to carry off the excess washing water to prevent flooding of the surrounding ground. In the hot weather of 1926, Lieutenant-Colonel F. A. H. Clarke, R.A.M.C., O.C. British Military Hospital, was indefatigable in hunting down all breeding areas, and Captain Sahai, I.M.S., as antimalaria officer, got through an immense amount of good work. I sincerely hope that 1927 will show as good results as 1926 in both Amritsar and Lahore, and that an extended system of proofing may perhaps remove from Mian Mir its unsavoury reputation summed up by "U.P.A." in one of his interesting and entertaining articles in the Journal, as being famous for: (1) pre-mutiny bungalows; (2) the well-stocked cemetery. I am, etc.,

Colchester,

November 1, 1927.

N. J. C. RUTHERFORD,
Colonel.

"LIAISON IN A WAR OF MOVEMENT."

TO THE EDITOR OF "THE JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

DEAR SIR,—One has been very much struck with the able exposition of field medical problems in Lieutenant-Colonel Garbowski's article, "Evacuation in a War of Movement" (JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, October, 1927), and particularly by the stress he lays on "inter-communication and liaison between the medical field units and their "opposite numbers" in the combatant formations. I think all of us who have had to face these problems on service will agree with him.

It takes, however, two to make liaison just as it takes two to make a quarrel! The crux of the whole problem, as it affects a field ambulance at any rate, might almost be said to be first liaison! second liaison! third liaison! i.e., first liaison between the R.M.O. and his battalion headquarters and the field ambulance company (A.D.S.), second liaison between the field ambulance, A.D.S. and the R.M.O. and brigade headquarters, and third liaison between the A.D.M.S. and divisional headquarters. If the liaison is good, evacuation of casualties is smoothly carried out; if it is not good then chaos and delay are inevitable with consequent loss of life and hardship. This is realized very thoroughly by officers of the Corps, but not so thoroughly by their "opposite combatant numbers," who, often harassed by their own particular problems, not unnaturally expect the medical service to look after itself. This it cannot do entirely, and the nature of its work in the field necessitates help from others, in other words, information, and information is as a rule more valuable if it comes from the front where the wounded are and not from the rear, as the knowledge of the formations further back is often obsolete by the time it filters to the field ambulance.

Even now, with experience of a great war behind them, their obligations to help the medical service for the sake of their own wounded is often not realized by senior combatant officers, i.e., brigade and battalion, etc., commanders and their staffs.

Those of us who have had experience on manoeuvres of late years still find themselves up against the same difficulties in the matter of information and liaison as they did in the years of grace prior to 1914.

Lack of knowledge on the part of combatant officers of the organization of field medical units, their capabilities and, above all, their limitations, is often at the bottom of these difficulties. One still hears and sees (in operation orders) an ambulance wagon described as a field ambulance.

There is no need to cumber your space with the account of how these difficulties should be met, but we all know "how" in the Corps, but it is surely time that something definite should be laid down in F.S.R., stating how brigade and battalion commanders should (will) help the medical service by putting the inter-communication service at their disposal as far as possible, stating and repeating in their operation orders the position of the corresponding medical "posts," i.e., battalion orders should invariably give the position of the R.A.P. and A.D.S. and W.W.C.S., and notify all concerned by after-orders or messages of any changes in the position of these posts, and in a similar manner brigade orders should keep troops informed of the position of A.D.S. and M.D.S. and W.W.C.S., etc. If this were done many difficulties would be surmounted and the extra work thrown on the staffs concerned would be more than compensated for by the increased rapidity of evacuations of casualties and the consequent improvement in mobility and *moral* which accrues therefrom.

I am, etc.,

KEPPEL H. REED,

Lieutenant-Colonel, R.A.M.C.

Notices.

EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, etc. He will also be glad to receive items of news and information regarding matters of interest to the Corps from the various garrisons, districts, and commands at home and abroad.

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The Committee has sanctioned the publication of correspondence on matters of interest to the Corps, and of articles of a non-scientific character under a nom-de-plume. These communications must, however, be approved by the Editor before publication.

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Original Communications.

L'ENTENTE CHIRURGICALE.

By I. A. F.

ON September 7, 1914, the German onslaught was checked and the British and French armies were beginning to advance on the Marne.

On the same day I arrived at Cointreau-sur-Aube " . . . for the purpose of establishing a railway rest and refreshment station to serve British ambulance trains en route to the base."

I had with me a detachment of the Royal Army Medical Corps, consisting of a serjeant and ten men, and a gunner of the Royal Garrison Artillery who acted as batman.

Serjeant George Grimshaw was a "Lancashire Lad," sturdy, dour and curt of speech; but he was a "champion" worker, very reliable and a general favourite. He knew how to temper discipline with mercy, thereby saving me trouble and keeping the unit in order and good spirits at the same time.

The men were a mixed lot, mostly good, and always cheerful and hard-working. Gunner Waggleby had mobilized as a Reservist, but had been found medically unfit for the front line. His feet were as flat as pancakes, and he had such a severe degree of knock-knee that his trousers were always in holes. His cortical grey matter functioned slowly. However, he was good-natured; and his invariable placidity often served, by reflex action, to calm our nerves and restore our sense of humour when tempers were strained.

Our impedimenta included quantities of surgical supplies, medical comforts and rations of all kinds. They were packed in a couple of goods vans. A passenger coach served as our quarters.

The whole outfit was garaged in a siding—to the annoyance of the local railway officials. Our presence interfered with shunting operations and the handling of goods traffic. As day succeeded day the *Chef de Manœuvre* became more and more excited and voluble : so much so that I began to be persuaded that I was the main cause of the Entente's misfortunes on the Western Front.

At this juncture I handed over the *Chef de Manœuvre* to Serjeant Grimshaw. This arrangement only lasted for a day. It came to an end on the second morning when I found the serjeant threatening to bombard the *chef* with a choice collection of over-ripe tomatoes.

The crisis was upon us.

Enter Gunner Waggleby. "Leave 'im t' me, sir," said he.

After that the *Chef de Manœuvre* became quite tame—almost polite in fact. It may be that this change was not unconnected with the mysterious disappearance of a ham and several tins of condensed milk and butter : and the *chef* had a large and growing family. Whatever the cause, the effect was wonderful and welcome.

Gunner Waggleby was appointed Liaison Agent (in addition to his other duties) for the duration of our stay in Cointreau-sur-Aube.

The mayor was another individual who gave us trouble. He was a Freemason and a bigoted, extreme left Socialist : agin' the Government and agin' the war : a rude, surly fellow. Everybody in the village was more or less afraid of him. At our first interview we came to loggerheads, and Serjeant Grimshaw offered to knock him down. It was an awkward situation, as we were dependent on his good offices for several important things.

I instructed Waggleby, in his capacity of Liaison Agent, to deal with the mayor whenever his duties with the *Chef de Manœuvre* permitted.

Instant and complete success again !

His Worship was quite able to resist the demands of an impatient British officer ; but a British soldier who sat on his doorstep and sang "Tipperary" for twenty minutes on end was more than even he could bear. In a very short time the goods came to be delivered before Waggleby had bid "farewell to Piccadilly."

However, the *chef* and the mayor were exceptions. We were the first wearers of khaki to appear in this locality and we were given a royal rapturous welcome.

Cointreau-sur-Aube was twelve miles east of Paris and in the zone of the city's defences. The district was covered with orchards and market gardens. The whole countryside turned out to do us honour—for those were the early days of the Great War—and every visitor brought a gift. Fruit, vegetables, flowers, butter and eggs were forced on us until the dreary siding was transformed into a horticultural and dairy-produce show.

For over three weeks my men had subsisted on their rations. Their

vitamin-content was low. Now they gorged on peaches, pears and tomatoes; and they all suffered the natural consequences, several somewhat severely. Long before they left Cointreau they had had more than enough of fruit and vegetables; and a good thing too, for the stock of castor oil was reduced to vanishing point.

Each visitor, on handing over his gift, made a speech. It was difficult enough to deal with the accumulation of edibles: it was more difficult still to deal with the flow of oratory. It taxed one's ingenuity and feeble linguistic powers to compose about twenty speeches per day, and to ring the changes on grateful thanks, the strength of the Entente and the brutality of the Boches. When I became fatigued, or was at a loss, Messrs. Thomas Atkins, headed by Gunner Waggleby, always came to the rescue; and whenever their words failed—a rare occurrence—their pantomime succeeded.

At La Pucelle, about twenty miles south-west of Cointreau, there was another railway rest and refreshment station, in charge of Lieutenant William T. Raff, R.A.M.C. (S.R.). Since those days William has risen to exalted rank and dizzy eminence; but in September, 1914, he was known as an international athlete, a good singer, a confirmed optimist and a great exponent of *la joie de vivre*. Naturally, William was a favourite wherever he went.

He was adopted by the officers of the 21st Lorraine Lancers, whose dépôt was at La Pucelle. This dépôt was receiving large numbers of remounts, and William—to whom inaction was odious—was allowed to work off his impatience and energies in the riding school. As a broncho buster William scored an immediate and popular success. It is true that his numerous acrobatic movements—whether on or off the mustangs—are not part of the curriculum of the orthodox *haute école*; but as *divertissements spéciaux* they were much appreciated by the French cavalry officers.

The evenings were enlivened by a series of *grands concours de l'Entente* in the course of which our William again figured as a star performer.

The exploits of "Le Chevalier Guillaume R-rraf" are enshrined now in the traditions of the Officers' Mess of the Lancers of Lorraine.

To return to Cointreau-sur-Aube: at 2 a.m. on September 8 a British ambulance train, en route to St. Nazaire, arrived at the station. Not a light showed: an occasional snore was the only sound to be heard: and yet the train was packed with wounded. I had difficulty in rousing the officer-in-command. When at last he understood my mission he said: "For Heaven's sake go away!" He was fast asleep again before I had time to close the carriage door.

That was the first and last British train we saw, as evacuation from the front was switched on to another line of rail.

Our rest and refreshment station ceased to function as such from its birth.

Trainloads of French wounded and German prisoners passed through at frequent intervals. I was standing on the station platform when the first train with prisoners pulled in. A German officer saw me and addressed me thus, in French :—

“Cursed name of a dog! Is it that you are the most dirty pig in the world? I ask you—why have you placed me in a wagon of the second class? I—I am a Prussian officer: I demand that I be conveyed in a wagon of the first class, reserved. Listen to me well, scoundrel!”

This was too much for our worthy station-master. With a muttered “*Bigre!*” he suddenly directed a stream of water from a hose towards the Prussian tiger's carriage window. It was a well-aimed jet: the window, second class, was shut hurriedly and, as the train moved off, we could see the *Herr Kapitan* mopping his moistened brow.

At Cointreau the French ambulance trains off-loaded serious cases likely to be prejudiced by further travel. These cases were taken to *L'Hôpital Auxiliaire No. Z*, a French Red Cross institution which was located in a fine new warehouse near the railway station.

On September 9 the hospital secretary, M. François Bregentzer—who was also owner of the warehouse—invited me to visit “Numero Z.”

It was evident that matters were not going too well. The hospital's staff and resources were incapable of dealing satisfactorily with the situation. So, as I and my men were now unemployed, I offered our aid. The offer was promptly and gratefully accepted.

It is convenient to anticipate events and to give a brief description of *Hôpital Auxiliaire No. Z* and its staff.

The institution was run by a local committee presided over by Mme. la Comtesse Lafontaine. M. le Comte Louis Lafontaine was vice-president and treasurer. They were all very pleasant, kind people; but they knew nothing about hospital administration or doctoring, and their initiative was hampered by a “higher authority” in Paris, of whom they stood in abject dread. I used to indulge in sarcastic chaff at the expense of their *Directeur Suprême*, but they never quite liked it and prophesied that my levity would lead me to a bad end.

M. Bregentzer, the secretary, was the only person in the place who could—or would—speak English.

The medical staff consisted of a surgeon and two general practitioners. The surgeon, Jules Clin-d'Œuil, was a young Parisian, recently qualified, and acting as an *interne* in a Paris hospital when mobilization took place. He had been found physically unfit for front line service; but although the flesh was weak the spirit was effervescent. He was a merry fellow, *très spirituel*, and an excellent surgeon. In those days I was rather proud of my clinical abilities; but I soon found that in the realm of surgery, at any rate, Clin-d'Œuil was my peer.

Doctor Blampied was a fine old man but an indifferent physician; he

had been passed in the race. He and I became firm friends, thanks to our adherence to the monaural type of stethoscope.

Blampied : "Good day, my dear *majeur*, and how goes thy stethoscope unique?"

Self : "Very well, my dear doctor."

Clin-d'Œuil : "In America you two would be incarcerated by the gendarmes—and rightly."

Blampied : "Figure to thyself, my dear *majeur*—but this poor idiot Clin-d'Œuil has never even heard of the great Laënnec!"

Clin-d'Œuil : "*Ohé!* you talk of the monsieur who died in 1816? Assuredly I have heard of him—and of Æsculapius also. You do not propose to bleed me of twenty litres, do you?"

Blampied : "But why not? Is it not that that to you would carry much of benefit? Be frank, my dear *majeur*, and confirm that which I say to this infant misguided."

The third member, Doctor Pierre Langouste, was of a different type. He was an efficient, busy man with a big practice. His outlook was typically Gallic; the patient was "a case" rather than a human being.

He was also an anti-cleric and positively hated the sight of Monsieur le Curé Josef Marie Massepain. When Dr. Langouste was in the wards the curé was denied admission; when the curé was in the wards the doctor refused to enter. In this there was nothing personal; but in France religion and politics—often combined—lead people into queer avenues of thought and action.

To know the good old village priest was to love him. I first met him in his church. It was twilight. The interior of the building was wrapped in soft, silent shadow. As I turned to go, the last rays of the sun illumined the west window and rested on the head and shoulders of the old curé, who was watching me from behind a pillar.

"*Bon jour, mon curé.*"

"Bless you, my child," and he took me to his fat little arms!

It is unpleasant to be an unwilling partner in a paternal embrace of this kind, especially when your heart tells you that you are a deceiver. The curé prolonged the agony by refusing to believe that I was not of his flock; and, when at last he did realize the truth, his amazement was unbounded.

"But thou hast given alms, hast thou not?"

"And why not?"

"Then, thou hast said, '*mon curé*' hast thou not?"

"Certainly—yes."

"*C'est merveilleux—mon Dieu—tu as prié!*"

"That is so."

"Then it is true; this frightful war has brought again the age of miracles. *Venite, exultemus Domino.*"

The discovery that although not of his flock yet I did not march with

Langouste, the mayor and Co., came to the simple old man as a divine revelation.

We manage things of that kind better in England.

The nursing staff of the hospital was headed by three Regular Army nursing sisters who were, of course, fully trained. The senior was tall and strong. Her breast was covered with medals and her face was tanned and wrinkled by the desert sun. She was imperious, indefatigable and reliable. We all liked her, for under the rough exterior beat a good woman's heart. She was referred to invariably—except in her presence!—as *La Marocaine*.

Mademoiselle Claire was a capable young woman who worked in the wards. Mademoiselle Germaine acted as theatre sister. The latter was pretty and lively; she, in concert with the irrepressible Clin-d'Œuil, gave *La Marocaine* a good deal of trouble and anxiety. I rather think that this precious pair devised some of their pranks *à deux* for the special purpose of teasing the staid and conscientious senior sister.

It is curious that one never heard mentioned the surnames of any of these ladies.

Heavy work in the wards was done by nuns from the neighbouring convent. The tireless devotion and loving care shown by *les sœurs religieuses* were beyond all praise. My best friend and staunchest ally was Sister Simonne. She had left her native land, Ireland, when she was 20; she was now about 60 years of age. During these forty years of exile she had lost not only the brogue, but the tongue as well. However—praise be to the great Saint Patrick!—her cheeks were rosy, her eyes were grey, and I am certain her hair was red—though, to be sure, 'twas hidden from view; at the end of forty years the features of Sister Simonne remained those of a true daughter of Erin.

Unfortunately, none of these nuns was skilled; and, in the circumstances, hard work did not compensate for the lack of technical training. The latter defect was also marked amongst the Red Cross personnel: literally, they did not know the ABC of either First-Aid or Home Nursing; the services of a British Voluntary Aid Detachment would have been invaluable.

The members of *La Croix Rouge Française* at Cointreau were a mixed lot. A third-year medical student who acted as dispenser and anaesthetist: a good fellow. A rich Jew who drove his own motor ambulance: *embusqué*, undoubtedly. And a number of ladies who got in the way at inopportune moments, but who never were at hand when there was dirty work to be done. Their horizon seemed to be bounded by *bouillon chaud* and cigarettes—or so it appeared to me.

If I am mistaken, I crave their pardon.

I do not think I am mistaken.

Finally, and in a class by herself, Madame Jeanne Gros-Cœur, the gardener's wife, deserves special mention. When the staff had left the wards for food or rest, it was Jeanne who fetched the cooling drink and smoothed the rough pillow: Jeanne's hunger and sleep could wait. When *monsieur le docteur* was fatigued, Jeanne cheered him on: when *La Marocaine* became fractious, Jeanne calmed her: when the poor *poilu* despaired, Jeanne filled him with new hope. Jeanne had many thoughts for others, but never a one for herself.

"Blessed are the merciful: for they shall obtain mercy."

On the afternoon of September 9, I took possession of two of the wards, with Dr. Blampied as physician and *La Marocaine* as sister. About twenty-five beds were occupied by a few Saxons, fair haired, blue eyed and mute: half a dozen Senegalese and Algerians: and the remainder French Regulars and Territorials, including three officers.

Jules Clin-d'Œuil was surgeon-in-charge of the other two wards, with Dr. Langouste and Mlle. Claire on his staff. He, also, had about twenty-five patients. They included a couple of British soldiers. Neither they nor I ever discovered how they got there. They were making good progress towards recovery and they were, of course, the lions of the establishment.

The operating theatre was in charge of Mlle. Germaine. I put my two best orderlies at her disposal, and she collected my autograph.

While re-organization was progressing I learned that, at night, Madame Gros-Cœur, the gardener's wife, was the only person who ever entered the wards. None of the Red Cross ladies could stay in the building after nightfall—unless protected by their respective men folk: but by this time the latter were scattered far and wide over the various fronts. Nor were the nuns available, for they had to be behind the locked convent doors by sundown; and they took the Army Nursing Sisters with them.

Now, Jeanne worked very hard all day and every day; even if she had been skilled, she was physically incapable of working all night as well. What this meant to the wretched bedridden patients is better imagined than described.

I asked for permission to detail four of my men for night duty—one for each ward. The request was granted with alacrity. Jeanne wept for gratitude; and, for the patients, night lost some of its terrors. This left me with three orderlies for day duty in my own wards. Serjeant Grimshaw acted as serjeant-major, ward master, assistant dispenser, and *aide à La Marocaine*: he was kept busy! Our cook prepared the detachment's meals and looked after the waggons in the siding. Gunner Waggleby, in the intervals of cleaning my belt, boots and buttons, continued to keep a watchful eye on the *Chef de Manœuvre* and the mayor.

Unfortunately—but of necessity—the initial stages of our work at Cointreau were revolutionary and, on two occasions, stormy.

Prior to our arrival on the scene, ward work had been confined to three forms of activity :—

(a) Universal and liberal applications of *teinture d'iode*.

(b) Face washing. N.B.—Faces only.

(c) Administration of the eternal *bouillon chaud*.

We soon extended the processes of minor surgery, and that met with approval. We washed—yea, we scrubbed—other portions of the anatomy besides the face, and the patients looked, and felt, fifty per cent. better. An abundant supply of vitamins from the horticultural show in the siding set the seal on our popularity—for the time being. Flushed with success we pushed on with the good work ; and although we never for a moment lost prestige with our patients, we very soon found ourselves up against the determined opposition of the committee.

The weather was hot and sultry. In the wards the smell of unwashed humanity and of pus—not of the “laudable” variety—was strong. Not only were all the ward windows shut and bolted—they were actually fastened securely by means of screws.

On the afternoon of September 10 my men removed the screws. The windows were thrown open and the wards flooded with sunshine and fresh air.

The committee were mildly disturbed by this innovation. They were genuinely horrified when it was announced that the *majeur anglais* had given orders that the windows were to remain open all night. The announcement was made half-timorously, half-defiantly, by *La Marocaine* : “for” said she “although it is a hazard, nevertheless it is intriguing to be associated with a so great original in a so great phenomenon.” A long and tiresome argument followed : I remained politely firm : the committee retired discomfited, but unconvinced.

Next morning all the patients were still alive.

September 11 proved to be a laborious and exciting day. Orders had been issued previously for an “all hands” parade. By 7 a.m. the whole detachment, reinforced by several stalwart nuns and whipped up by Sergeant Grimshaw and *La Marocaine*, were working like galley slaves. The patients were carried in their beds on to the lawn, and there made comfortable under the trees. This was a heavy job and had to be done with care. Then the floors and walls of the wards, and the passages, were scrubbed thoroughly with soapy cresol solution. The windows were also cleaned. By 9 a.m. the night orderlies were sent off to bed with a rum ration ; and, when the committee arrived at 9.30 a.m. they were faced with a *fait accompli*.

We scented trouble because the committee began by reconnoitring our position : scouts were sent out, visual observations were made and, when enough information had been collected, collated and confirmed, the committee descended upon us in formal order of battle.

The scene comes before my eyes now. A hot morning with a blazing sun ;

the beds on the green grass in the shade of the trees ; the patients full of good spirits, their aches and pains for the moment forgotten ; an orderly completing the toilet of a window to the unending strains of "Tipperary" ; Serjeant Grimshaw lighting Serjeant-Major Bonaparte's cigarette ; *La Marocaine* resting in a long chair ; Jules Clin-d'Œuil on the balcony of his ward—"In Heaven's name, from whence issueth this cursed odour of coal-tar?" when—enter the committee.

A moment's silence. Count Lafontaine kicks off.

"Do you figure what *Monsieur le Directeur à Paris* will say to all this? Is it that bronchitis, phthisis and pneumonia are to be added to the already immense sufferings of the poor *poilus*? But no—this is an enormity!"

Sounds of dissent from the poor *poilus*.

I reply by giving a short description of the Treloar Colony at Alton. Clin d'Œuil ejaculates "*Bon !*" like the sound of an air gun, but is immediately put out of action by M. Bregentzer, who shows that what is good for the brave British is not necessarily good for the gallant French.

The committee approve of this line of argument. *La Grippe* and rheumatic fever are brought up to strengthen the position. I counter by delivering an impassioned oration on the therapeutic properties of oxygen and the curative effects at the violet end of the spectrum—but the committee will have none of it: I am talked down.

Pandemonium reigns. The committee register antagonism and despair ; my partisans, particularly the patients, display indignation and disgust. The attitudes adopted by two individuals are worthy of record. Serjeant Grimshaw looked very bored ; but although he kept clear of the dog fight, there was a dangerous glint in his eyes. On the other hand, Clin d'Œuil ran up and down the balcony gesticulating and shouting ; at one moment backing me up, and at the next encouraging the committee. This puzzled me—until it was all over, when he came to me and said : "Your Serjeant Greemshaal—is he not magnificent? The bulldog, eh? Ah! but I thank you, my dear *majeur*, for the best debate I have heard since my student days. The learning—the vehemence—the heat—yes, to-day with it I am very content. Your Greemshaal—*Voilà !* a man altogether correct!"

The committee surrendered when it became plain that my temper was frayed, and that I intended to march out, with my detachment, unless my professional views were allowed to prevail.

It was now 11 a.m. At noon I sought out M. Bregentzer. I was still feeling sore ; he had boiled over and was chastened. We concluded a pact of mutual understanding and forbearance, and from that moment we were all the best of friends.

On September 12 the screws in Jules's window frames were removed ; and we heard that his patients' feet, etc., were being washed. On the 13th his patients joined mine on the lawn. My fellows greeted them with loud

cheers, which were renewed when the smell of hot cresol solution drifted across from my colleague's wards.

It was a great and glorious victory.

An ordered routine began. Serious cases from the ambulance trains were received alternately by the two sets of wards. All morning, while *La Marocaine* and Grimshaw busied themselves in the wards with cleansing and minor dressings, Clin d'Œuil and I operated. In the afternoon and evening everyone was hard at it in the wards nursing and performing major dressings.

It had been arranged that I should operate on my own patients, Clin d'Œuil assisting; and that I should act as assistant to him when his patients were on the table. In spite of this the morning usually began in this way:—

Anæsthetist: "The wounded one sleeps."

Clin d'Œuil: "Good! And now, my dear *majeur*, the honour is to you."

Self: "But no—I will not operate; he is your patient; it is understood that——"

Anæsthetist: "All is ready. He sleeps still."

Clin d'Œuil: "My dear colleague, that signifies nothing. He is the first wounded one to-day; therefore the honour—it is to you; and if it is not, may I perish of shame! Is it not so, Mademoiselle Germaine?"

Mlle. Germaine: "Undoubtedly, yes; but the wounded one sleeps."

Anæsthetist: "Yes, he sleeps."

Self: "Look you, my friend precious, it is not justice to me; it is not fairplay to your wounded one; it is not the sense common; it is a position false and uncertain; it is——"

Clin d'Œuil: "Heavens! Listen to the ingratitude base; regard a friend of the beautiful France who——"

Anæsthetist: "Still he sleeps."

And so it went on; but the end was always the same; as the patient could not remain anæsthetized for ever I had, perforce, to submit and accept the "honour."

Jules was nothing if not obstinate.

Those early essays in war surgery stirred us profoundly, and often filled us with astonishment and dismay. Such mutilation, such suffering! Fortunately we were too busy in the exercise of our craft to ponder overmuch on the fundamentals of the matter; and—as everyone knows—constant and intimate contact with this most horrible side of war led, in the end, to a dulling of one's finer perceptions and powers of inquiry and criticism: a merciful dispensation of Providence which sustained the surgeon, and—paradoxical as it may seem—helped in the salvation of his patient.

Later events have become dim in one's memory. Many of them have faded away altogether. Not so with primary impressions; these remain photographed on the brain clearly, deeply, permanently.

A sharp struggle is followed by the extraction of a fragment of a large-calibre shell from beneath the patient's gluteal muscles. The missile is shaped like a pudding basin. It is twelve inches in diameter, its edges are as ragged as a coral reef, and it weighs nine pounds. Clin d'Euil faces me and stares at the monstrous piece of steel, fascinated; his eyebrows elevate, his red moustache bristles, and his mouth puckers into a whistle. Mlle. Germaine bends forward, lips parted, and shrinks back with a little cry. One orderly clutches the other by the arm, points to the pudding basin, and mutters "Gawd!"

The patient recovered. I like to think that the pudding-basin is now filled with fragrant, flowering bulbs.

A staff officer had a small wound in the calf of the leg. Under a local anæsthetic we removed a perfect specimen of a nickel-plated bullet. I can still see this officer, an hour after the operation, giving the village watch-repairer detailed orders regarding the missile. Next morning the bullet, mounted in gold, was hanging on the patient's watch-chain. "*Voilà—un diable en or!*" said the old workman.

Clin-d'Euil recovered a curious object from a patient's thigh. It resembled the ball ornament which used to surmount our pre-war helmet; but it was bigger, solid and made of iron. Still, we thought it must be a portion of uniform or equipment, as it had stamped on it a grenade and the letters "R.F." The patient solved the mystery. He remembered that, at the moment the shell exploded, he was leaning against some railings in front of a village *gendarmérie*. The projectile was the top of one of these railings.

Our favourite patient was a regular serjeant-major of infantry, Pierre Bonaparte. He and Grimshaw were great friends. His left shoulder was shattered. The injury was fixed by means of a plaster-of-Paris jacket; but it needed much manipulation and dressing which must have been excruciatingly painful. Bonaparte never uttered a sound, never winced, and never ceased smiling, even when he paled and his brow was covered with sweat. A brave little man.

In the wards we first met with diseases which afterwards became more familiar, though never less terrifying. Foremost of these was what we afterwards came to know as gas gangrene: in those early days it was "moist gangrene," or "malignant œdema"; and always its ætiology was a puzzle, its course a thunderbolt, its treatment a forlorn hope and its cure an impossibility. It ambushed us in the night: we knew not how to stave it off: and, when everything was ready for amputation, the patient's general strength tipped the balance on the wrong side. In those days gangrene was synonymous with mystification and despair.

Then another anaerobe shook us. Mahomed Abrouk was a Senegalese *tirailleur* : a cheerful, uncomplaining man. He had a small through-and-through bullet wound of the fore-arm. The bones were untouched and the lesion seemed to be healing well. One morning when I greeted him he did not answer. He sat up in bed and grinned at me. I repeated my greeting rather sharply. He said nothing : merely leered from ear to ear, displaying a double row of fine, white teeth. Naturally I resented this conduct and was on the point of dealing out a severe reprimand for impertinence, when *La Marocaine* hissed in a tragic whisper : "*Le tetanos !*"

Poor Mahomed Abrouk had a sad end.

That was only the beginning. The dreadful disease haunted us, for, while I remained at Cointreau, antitetanic serum was unobtainable. All supplies in Paris and elsewhere had been expended and fresh ones were not yet forthcoming.

During this period the sounds of battle never ceased, sometimes loud and clear, sometimes mere reverberations, depending on variations in distance and "atmospherics."

One afternoon there was an unwonted calm. Rumours flew thick and fast.

That night the silence continued unbroken.

Next morning rumour gave place to certainty : the enemy was broken and in retreat !

At 11 a.m. (symbolic hour !) I left the theatre and was entering the wards, when the curé, Josef Marie Massepain, appeared.

"Thou hast a moment of leisure, my friend ?"

I had not ; but the curé had a compelling, because lovable, way with him. "Come, then." He slipped his arm through mine and led me to the easterly end of the garden. "Listen !" said he.

A bird sang. The leaves of the trees rustled. A murmur of voices sounded from the direction of the hospital : that was all.

"Thou dost not hear the sound of cannon ?"

"No."

The old man bowed his head, closed his eyes and repeated a prayer in Latin. My rusted brain did not understand, but I believe my spirit did. Then he looked up at me, smiling.

"Ah, well, my son ! thy Tip'raree, for example—it is a great and glorious song. A soldier's song. But for me. No—forbidden ! For me, '*Venite, exultemus Domino*'—it is—how shall I say it?—for me it is more *convenable*."

"And perhaps—to-day—for me also, *mon père*," I replied.

We walked back, silent and rejoicing.

We were all on twelve-hour shifts. The night staff came on duty at

8 p.m. and were relieved at 8 a.m. They then went "on pass" till 11 a.m., when they had to be back in quarters for rest. The day staff began work at 8 a.m., and were allowed out "on pass" from 8 p.m. to 10 p.m.

In the second week of our stay we instituted intensive courses of instruction in nursing, clerking and storekeeping for the nuns and employable Red Cross workers. The unemployables amongst the latter were got rid of on one pretext or another. The way in which the committee managed this filled me with admiration. Tact was not always a conspicuous feature but expedition was. A Frenchman in authority is a great exponent of direct action.

The courses of instruction were a success and promised well; so much so that, when my men marched out of the place for the last time, partially trained substitutes were ready there to fill all their places at once, even including the night staff. This, I think, was the best "souvenir" we left behind us in Cointreau.

When we were off duty people were very kind to us. The labours of a long and trying day in the theatre and wards were lightened by the good things of the table, and entirely dissipated by Jules's jokes when he was in form. Clin-d'Œuil was a born mimic and *raconteur*, and was seldom in anything else but good form. In spite of being tired, one went to bed feeling quite refreshed! I never had a sleepless night.

In this way three weeks passed like a flash—until Somebody remembered, or discovered, that we were neither engaged in our lawful occupations nor even situated in the zone of the British Army. A telegram arrived ordering us to repair forthwith to Somewhere Else in France.

The *Chef de Manœuvre* announced that, at 06-00 hours on the following morning our coach and wagons would be hitched to a passenger train travelling in the required direction.

Taking leave of the committee was not easy. I fear that my halting acknowledgments fell far short of the oratorical standard set for the occasion. Perhaps the committee made allowances.

Saying good-bye to the staff was more difficult still: the gardener's wife, the old Irish nun, Mlle. Germaine . . . but, when large tears trickled down *La Marocaine's* weather-beaten features—well, that upset me.

The patients completed my discomfiture. They were tremendously grateful for what we had done and thoroughly depressed over our departure. It was impossible to remain unmoved in face of their affectionate demonstrations: a fine tribute to Mr. Thomas Atkins, R.A.M.C. I shook hands with Bonaparte and beat a hasty retreat. As I crossed the threshold I saw an embarrassed Grimshaw receive a resounding kiss from his pal, the French serjeant-major. Loud cheers from all patients fit to cheer!

There remained Count Louis Lafontaine, Monsieur le Curé and Docteur Jules Clin-d'Œuil. At 8 p.m. we four sat down to supper in the priest's house. The curé had a discriminating palate and a fine taste in wines; a true *bon vivant*.

How we talked!

At 9.30 p.m. we played bridge; the Church and State versus Medicine. At first the Church and State won, and the curé became positively brilliant. Then Medicine took the lead, and the curé became decidedly peevish: the old man was a bad loser. My partner sent over an urgent S.O.S., whereupon we made a series of egregious blunders and Church and State won again. The Count must have suspected us, but, being a sportsman, he overlooked any irregularity in the urgent necessity of restoring his reverence's peace of mind.

We parted with many expressions of goodwill and regret. Clin-d'Œuil linked his arm in mine as we walked towards the railway station.

The black, silent mass of the convent was bathed in the soft rays of the moon. "*Voilà les infirmières!*" said Jules, pointing to an upper window where a streak of light could be seen issuing from a gap between the curtains.

"You are a lover of melody?"

"Yes."

He pulled me into the shadow of the wall and, in a clear tenor voice, sang this:—

*"Mon capitaine, mon bel ami,
"N'as-tu pas regret de mourir?"
"Tout le regret que j'ai au monde—
"C'est de mourir sans voir ma blonde."*

*De tout loin qu'il l'a voit venir
Son cœur en est tout assoupi.
"Voici donc, cette jolie blonde,
"Tout ce que mon cœur aime du monde!"*

*"Engages rien pour moi, ma blonde?"
"J'engagerai mon blanc cheval;
"Et le ruban de ma ceinture
"Sera pour guérir ta blessure!"*

As the last note died away, a white hand was thrust through the gap in the curtains, a white handkerchief fluttered for a moment and—the light was put out.

We passed *L'Hôpital Auxiliaire* No. Z, where, until daybreak, my men were keeping their last vigil.

We came to the siding.

"*J'ai le cafard.*"

"*Moi aussi.*"

" *Au revoir, mon vieux.*"

" *Au revoir, mon majeur.*"

" *A bas le Chef de Manœuvre.*"

" *Vive l'Entente Chirurgicale !*"

Jules Clin-d'Œuil disappeared in the darkness. I could hear his footsteps on the road keeping time to a whistled melody. It was "Tipperary," *tempo andantino sostenuto*. At "Leicester Square" Jules melted into the night.

At 7 a.m. I woke.

The train was heading north.

DIARY OF A D.A.D.M.S. ON THE JERUSALEM CAMPAIGN, PALESTINE, NOVEMBER-DECEMBER, 1917.

BY LIEUTENANT-COLONEL H. F. HUMPHREYS, M.C.

Royal Army Medical Corps (T.A).

THE following diary was written exactly ten years ago at the time of the events it describes when the writer, then a Captain, was D.A.D.M.S. of the Yeomanry Mounted Division. It was not intended for publication, and when a Regular officer who read it a few months ago suggested it might be of some general interest as illustrating the difficulties of the divisional medical services in cavalry warfare, I was faced with the choice of rewriting it for publication, or leaving it as it was. Lack of leisure and a failing memory of events led me to adopt the latter course. I trust its originally private nature will be held to excuse its purely personal tone. The meaning of terms such as "divisional receiving station," etc., will be found explained in the notes published in the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, December, 1927. The verses at the end were conceived at the end of an exciting day described in the diary.

The Yeomanry Mounted Division consisted of three brigades, the 6th, 8th and 22nd Mounted Brigades (Mtd. Bde.), each with its own field ambulance (F.A.). The latter consisted of two sections each: the bearer section, whose business it was to collect casualties on the field and form a dressing station in which they were treated, and the tent section which had wagons holding medical stores and a few tents, and was able to retain cases for a day or two if pressed. All the men of these were mounted and so able to keep up with cavalry, and for the transport of wounded each F. A. had twenty camels carrying each a double litter (called a cacolet), twelve sand carts (light two-wheeled carts drawn by four mules and capable of carrying two or three men each), and four Ford motor ambulances.

The mobility of cavalry, the rapid advance, and the fact that we so often marched away from supplies and organized communications, forced us to employ a tactical scheme for the field ambulances—which were of course under the direct command of the A.D.M.S.—very different from that of the textbooks. Generally speaking the officer in charge of the bearer section kept close to his brigade, made his dressing station under brigade arrangements and used camels and sand carts to get the casualties back to the tent section. The long distances over which we had to evacuate, our heavy casualties, and the limited amount of transport at our disposal, made it necessary to use the tent sections on successive days as collecting stations for the whole division. Once open they became immobilized till all casualties were cleared, so we usually opened one for every day of advance,

the others catching up as soon as they were clear of casualties and could move on. From these collecting stations casualties were taken back by the Ford motor ambulances (which we kept in one convoy for this purpose) to the receiving stations. These were a sort of mobile hospital, one for each division in Desert Mounted Corps, and were under the control of the D.D.M.S. of the corps: they were always tied to one of the two main roads of the plain and the D.D.M.S. moved them forward alternately in the same way and for the same reasons as we employed our collecting stations. So that just as all the casualties of any one day from the Division would be going to the tent section of one field ambulance so our collecting stations would be evacuating to the receiving stations of the Yeomanry, Anzac or Australian Division at different times during the campaign. Once in the receiving stations our responsibility for casualties ceased, and they were moved down the lines of communication under corps management.

The Division left the beach at Marakeb on October 28, and moved out to Shellal. For the initial phase of the operations we had been taken from Desert Mounted Corps and placed under the 20th Corps as part of their reserve, and as such we remained inactive at Shellal for several days while Beersheba was taken and the troops of 20th Corps got into position for the attack on the Turkish left wing.

November 5.—It was not till November 5 that we finally moved out to Beersheba. It was a long, hot march; there was no water on the eighteen miles there, and the great motor lorries taking supplies from Karm to Beersheba had even in those few days pulverized the surface soil, so that the column moved in a mist of dust that choked, blinded and parched us all. Headquarters reached Beersheba at 4 o'clock, though it was after 7 p.m. before the last details were in. The trim hangars and barracks of the new-built German cantonment were a strange contrast to the untidy litter of the native town, but I had no time to explore. I first rode to the well allotted to us for drinking water and saw that all was in order there, then went to the hospital, where our receiving station was to open up, and arranged for guides to direct them there when they arrived, and finally came back to the house we were using as Headquarters, in time for the arrival of our transport; after I had given instructions about water and sanitary arrangements, dinner was ready. Operation orders came round soon afterwards, and the A.D.M.S. and I drafted and dispatched our orders for field ambulances. We then lay down on the floor for a few hours, as we were to start at midnight, though the fleas effectually robbed me of any sleep.

November 6.—Half an hour after midnight we moved off. There was a good moon, but this was obscured by the mist through which our column wound in ghostly silence broken only by the creaking of saddle leather and the muffled padding of the horses' feet on the dusty ground. All wheeled transport had been left behind except for the light sand carts of the field ambulances, and, though we did not know it, we were destined not to see

our kit or our batmen again till our part in the campaign was nearly finished. Luckily I had learned to carry the bare necessities of campaigning on my horse: food, a coat, blanket and shaving kit, and on these slender resources I lived for a full month.

We slogged on, tired and sleepy, till nearly 4 o'clock, by which time we were well up in the foothills of the Khuwelfe range, close under the crest of Abu Jerwal. It was very cold, too cold for the halt to be restful, and we were soon kept wide awake by the noise of the 53rd Division attacking Khuwelfe. It was only two or three miles ahead, and athwart the pitchy darkness—for the moon had now set—the flashes of the guns lit up the sky, while the staccato chatter of machine-guns was incessant for nearly an hour. Then everything stopped quite suddenly, though whether the attack had succeeded or failed we could not know. Dawn now broke, and soon afterwards we began to come in for some random shelling. But an hour or two later orders came to move on. The 74th Division were attacking the Kauwukah system, and as they swung left-handed we were to fill in the gap that spread out between them and the 53rd on Khuwelfe. The A.D.M.S. moved off with Headquarters, and I went back to give orders to the field ambulances. We had decided to open up the 22nd Brigade Tent Section as a collecting station for the Division, keeping the other two in reserve with their brigades, and I picked them up as I passed the 22nd Brigade and moved them back to a likely-looking spot as far up as motors could reach them and just off the line by which supplies were to come. M. had turned up with the cacolet camels, having followed the Division at a camel pace, but there was no sign of B. with the cars. This was rather worrying, but I decided we could manage on camels for that day, and having written orders for camels, cars and the receiving station rode on after the Division. On my way I met C. coming back with casualties from the 6th Brigade, and directed him to the collecting station. Just as I got up with Headquarters two Albatrosses flew over and laid their eggs: one fell just on my left and killed a couple of horses, and a big fragment just missed my mare's head and made her jump. After dressing one man with a bomb splinter in his back and sending him off, I had some food while we waited an hour or so. It was now afternoon, and about three o'clock we moved forward for a couple of miles and finally halted in a wadi, where about sunset we picketed down for the night. Water was now becoming a problem: I had most of my water-bottle intact, for which I was glad, as there was none nearer than Beersheba, and it was not till next morning that some came up on camels. The horses were sent back to Beersheba—a twenty-mile trek—to water, and arrived next morning with tales of falling down wadis and losing themselves in the foothills all night.

November 7.—I went round to the field ambulances as soon as my horses got back; they most of them reported men and sand carts lost in the foothills: indeed, it was as likely a country to get bushed in as you could wish to find, no landmarks but the main range to the east and all

intersected with confused wadis and clay ridges. I rode back to the collecting station at Muweilab. They were quite snug, had picked up water from the supply dump which was close beside them, and had evacuated about forty casualties to Beersheba on camels. There was still no sign of the cars, and when I got back to Headquarters the A.D.M.S. wired to Beersheba to have them sent up. It was dark when I got back, but I hit off Headquarters nicely and had the luck on my way to find one or two of the strayed sand carts and shepherd them home. After dinner, regiments of the Anzac Division began to ride by; we heard that most of the Kauwukah redoubts had fallen, and we expected that the cavalry would get through next day. Our rôle was to be that of clearing the flanks of Khuwelfe and stopping any counter-attacks from that direction.

November 8.—There was no time to have breakfast before we moved off and then we crossed very broken country between Kauwukah and Khuwelfe. There were a lot of bodies lying about—men of the 74th Division, who had been caught by the Turkish guns during the advance of yesterday. As soon as we got into touch with Turks, and could be certain of the direction the Division was likely to make, I went back to the collecting station. Here to my relief I found the ambulance cars just arrived: B. had lost his way and spent two days wandering in the foothills before he found us. He was obviously unsuited to the job, and having loaded up the cars with casualties for Beersheba I sent him back there to join the receiving station and put M. in charge. I got some water for my horses here and had some food at the collecting station: and then I pushed on, taking one car to see if it were practical to get cars to Bir Khuwelfe. Our evacuation to Beersheba had now stretched out to over twelve miles, and I was anxious to get cars up as far as possible. But after getting the cars along for three or four miles, the going got so bad I had to send them back and pushed on to pick up the Division. It was awful country, rocky, wild and waterless, and in spite of the presence of two Divisions just in front I did not see a soul for six miles. Finally I hit off Bir Khuwelfe where I found the 53rd Division R.E.'s developing the water—the first out of Beersheba—and gave my horses another drink. The Turks had only left the place a few hours, and there was still some skirmishing with their rearguards just in front. I rode north-west through very broken country for a mile or two, and then began to find some units of the Division and soon arrived at Headquarters. The A.D.M.S. was relieved at my news about the cars, and we were able to load up the day's casualties on camels, and send them back to the collecting station. Hardly had they gone when the order came for the Division to break off the pursuit and march to Sheria. This set us a problem as it meant that our line of evacuation to Beersheba was done with. We sent a dispatch-rider to the collecting station, with orders to clear all casualties to Beersheba, collect all camels and sand carts as they arrived, and come with the whole convoy to Sheria via Irgeig. It was a long way round, but they could never have made their way across country

and on the Irgeig route they would be in touch with supplies. We sent similar orders to M. for the cars and then rode on to Sheria. Divisional Headquarters headed the column and we rode in about ten o'clock. The place was a perfect shambles, and I slept in the yard of the Turkish railway station, with the stench of dead men and horses invading me on every side—a most unpleasant night. Before I turned in I stumbled on a granary and gave my horses the best feed they had had since Shellal, besides stuffing all my nose-bags full of barley.

November 9.—At 4 a.m. I was awakened by an M.O. of the 8th Brigade Field Ambulance, who reported that his brigade had only just got in, and that he had about thirty casualties. I told him to make them comfortable and leave them on the ground with an orderly in charge if he were ordered off in a hurry. At 5 a.m. orders came for the Division to move on at once to Huj, and we arranged that I should stay behind to clear the 8th Brigade casualties and the sick, and to leave orders for the details coming up from Irgeig. A wire had arrived from D.D.M.S. Desert Mounted Corps (with whom we were now reunited) that the receiving station was moving up from Beersheba that night and would be able to take in casualties at Sheria this morning. I sent my groom off to water the horses at the pools in the wadi Sheria, and walked over to the 8th Brigade Field Ambulance to see their casualties. The ambulance was just moving off and I got them to leave a tent for the worst cases and a few men; and then I went back, picked up my horses and rode a mile or two along the Irgeig road to find the receiving station: it was nowhere to be seen and I began to think we should have to make a dump of the casualties for to-day at the railway station. I found a section of an infantry field ambulance standing to, waiting for orders to move, and they consented to collect my casualties who were lying a mile away across the wadi, and bring them in to the station. But by the time they had done this the receiving station had arrived and took the cases over, leaving me free to push on to Huj. I hardly expected the 22nd Brigade Tent Section or the cars up before afternoon and left them orders with the receiving station to push on to Huj and rejoin the Division with all speed.

I did the ten miles to Huj by map and compass and hit it off nicely, finding Headquarters on a hill amongst the litter of yesterday's battle: the guns captured in the charge of the 5th Mounted Brigade were near by. There seemed to be nothing much doing as we had found the Turks gone from Simsim ridge, so I had a shave and got my boots off for the first time since we left Shellal. It was now late afternoon and as soon as orders came that we were to bivouac here for the night I rolled up in my blanket to make up arrears of sleep.

November 10.—We started off at dawn next day with orders to march to Nejile and then operate in the Shephelah in the direction of Beit Jibrin. I collected a couple of men from the 8th Field Ambulance and gave them orders for the 22nd Brigade Tent Section and the cars to push on to Nejile

as soon as they arrived, which I hoped would be some time in the morning. The sick for evacuation this morning we had to send back on our few remaining camels to Sheria. This arranged I pushed on after Headquarters. It was intensely hot and dusty in the wadi Jemmameh and I kept to the hills and had a look at some of the Turkish works defending Huj. There were plenty of Bedouins about looting arms but they left me alone. We got to Nejile about noon: the water there was as black as ink with dead oxen from the Turkish gun teams lying in it: many of the horses wouldn't touch it, thirsty as they were, but we found a sump a little clearer than the rest which we could chlorinate for the men's water bottles and then the Division moved off in skirmishing order through the low hills of the Shephelah. It was very hot, the most parching day we had had, and the horses were looking very tucked up; most of them had only watered twice in the five days we had been out and the men were not in much better case.

Towards sunset we began to get into touch with the Turks and took up a line for the night, intending to attack at dawn, but about 8 o'clock an officer arrived from Corps Staff with orders for us to break contact with the Turks at dawn and go to El Faluje for supplies. This was welcome news as we had consumed the last of our rations and forage that morning and were all of us taking up belts and girths a hole or two. The idea was that after that we should march across to join the rest of the Mounted Corps on the left wing where the real pursuit was to be pressed.

November 11.—The medical position this morning was giving the A.D.M.S. and me a good deal of anxiety. The previous day we had dropped the tent section of the 8th Brigade at Nejile to act as collecting station for the Division, so that our available strength as regards ambulances had fallen very low indeed. Of the three field ambulances only the 6th Brigade had its tent section intact, and that reported having left half its medical equipment at Huj owing to a broken axle or two. The twelve sand carts apiece with which each had set out from Shellal had sadly dwindled: many had fallen by the wayside with axles hopelessly bent, half a dozen or more disappeared with their teams in the blind foothills of Khuwelfe and had not been heard of since: the same applied to the cacolet camels. The pace had been too hot for them, and the two miles an hour and the double journey entailed by every evacuation had caused them to be left hopelessly behind. Of our original sixty only about a dozen remained with the Division, while the Ford ambulance cars which we had relied on to do all our long distance evacuations had been lost to us ever since the Division was whisked away from the right wing to the centre and we had had to cut loose from our line of evacuation to Beersheba. We arranged that the A.D.M.S. should go on with the Division, whilst I went back for two or three days if necessary, cleared the collecting station at Nejile, collected as much of the lost transport as I could and brought it over to the left wing by forced marches. It was obvious that if the Division had heavy casualties

there would be a medical breakdown in the present low state of our resources.

I waited till 7 o'clock to see if the move westward were cancelled or not, and then rode back over the swell of the Shephelah down to Nejile. The sky over the Judæan highlands was murky and lowering, the morning very close and oppressive, and by the time I reached Nejile it was obviously blowing up for a sand storm. At Nejile I was relieved to find the 22nd Tent Section who had been following us up from Beersheba by forced marches. They had picked up my chits at Sheria and Huj and arrived at Nejile the night before. They had seen nothing of the cars, and in their haste to catch up had left twenty or thirty cacolet camels on the road under the charge of a N.C.O. These were the camels which had brought back the Khuwelfe casualties to them on the 8th, and which we were hoping would arrive with them. However, it was something to have another Tent Section to play with, and we sat down to a breakfast of porridge and fried bacon—the first cooked food I had tasted since we left Shellal.

Casualties came trickling in all this time, and when the last were in I found the 8th Brigade Tent Section had about thirty on their hands. There was no supply of wagons or lorries to take them off, but an Australian medical orderly rolled up on a horse, with a chit from the D.D.M.S. saying that the receiving station had been moved up to Um Ameidat, only three miles away. I sent the orderly back with a note asking for cars to evacuate our casualties, told the 22nd Brigade Tent Section to saddle up and make Kaukaba that night, and the 8th Brigade Tent Section to do the same as soon as their casualties were cleared. I then pushed back along the tracks of the Division towards Huj in the hope of falling in with some of the lost transport. My luck was in. Only two miles out I fell in with M. and five ambulance cars. They were all that was left of our dozen, the rest having broken down or got lost at various points on the journey up from Beersheba. M.'s spirit was almost broken, but I cheered him up with fallacious stories of real roads farther on, gave him my only big scale map, and sent him off to make Kaukaba that night and bivouac with the two tent sections. The sand storm was now at its height, and I was afraid I might miss some of the transport in the high wild hills between Nejile and Huj. The 60th Division and the Imperial Camel Corps had come east from Huj, and when in the afternoon I reached the latter place all the hospitals, supply dumps, etc., that had covered the ground two days before were gone. This made my search for our lost sheep easier, and my luck still held. I first found about a score of cacolet camels that had dropped behind the 22nd Tent Section in the march from Beersheba, and having found the Division gone from Huj knew not where to proceed. Then in the course of an hour or so I dropped on half a dozen more camels, together with four or five sand carts. All these had got lost at various times, and having tracked the Division as far as Huj were baffled by our rapid changes of direction after that. Into the sand carts I loaded the medical equipment of the 6th Field Ambulance left

behind at Huj and finally collected the whole party and bivouacked for the night near the well. Most of the lost sheep had collected rations and forage by the wayside from various good samaritans, and having watered the thirsty beasts we sat down to a square meal well content at the reunion.

I had now recovered the bulk of our lost transport and determined to start before dawn and pick up the cars and the tent sections at Kaukaba early.

November 12.—We started off in the dark at 4.30. I had only a small scale map, having lent my good one to M.; but it proved to be sufficient, and by forced marching we made Kaukaba before nine o'clock. It was an interesting march: there had been some thunder and a little rain in the night and the air was much cooler. Our path lay over rolling downs, and on every side were signs of the rapid Turkish retreat from Huj, abandoned guns and howitzers often with the draught oxen dead beside them, water gear and supply transport, and all the untidy litter of deserted camps, of which there had been many round Huj and Bureir. We saw no sign of any troops till we got to Kaukaba, though there were plenty of Bedouins looting arms, and once we were fired on by them. At Kaukaba I found the ambulance cars, and the 8th Brigade Tent Section arrived just as I did: they had lost their way the previous afternoon and were overtaken by darkness before they could reach Kaukaba. Of the 22nd Brigade Tent Section nothing was to be seen, and I learned later that they, too, had lost their way, had fallen in near Jel el Hesi with the 6th Brigade Field Ambulance, and with them had rejoined the Division at Mejdal, where they had all bivouacked for the night. I left orders for them with some Australian supply details I found there, and from the latter I learned that Desert Mounted Corps Headquarters were only a few miles ahead, while at Julis, six miles on, I should find supply dumps. I gave my party an hour to rest and feed the animals and have breakfast, and then started them off for Julis, while I pushed on in a car to Desert Mounted Corps Headquarters; there I learnt that the Division would be at Esdud that afternoon, and then pushed on to Julis to arrange about rations and forage for my party. Julis was a buzzing hive of activity, as great a contrast as could be imagined to the country I had just passed through. The 75th Division was marching through, and everywhere were elephantine lorries and dumps of supplies. As soon as my convoy was in, they picked up their supplies, and we all marched across to the coast road. I heard of water by Ferani, and left the camels and sand carts there with orders to push on to Esdud after watering, while I went on with the cars. I found Divisional Headquarters at Esdud about 4 o'clock. Later all my convoy arrived, and after dark I found another sand cart and some more of the lost cacolet camels which had found their way there and had the luck to run into me and recognize me. Poor devils, they had no food, forage, or water, but I got them a meal from an infantry field ambulance there, and, before I turned in, arranged for everyone to be distributed to their units. All our missing details were now

accounted for except the sand carts and cars that had broken down and been abandoned, and about ten cacolet camels with a few orderlies; these we heard afterwards had drifted into the 53rd Divisional Lines by Khuwelfe, and we did not recover them for some weeks.

The A.D.M.S. was pleased to hear of my successful salvage. The Division luckily had not been in action during the two days I had been away, but we were expecting a big fight next day, so that my thirty-mile trek with my convoy that day had brought them up in the nick of time, and we could face the next day with more confidence. All that afternoon the 52nd Division had been attacking Burka, and we had a splendid view of the battle from Esdud, while the shells from our guns shrieked over our heads and fell with distant thuds on to Burka redoubt. The thin waves of infantry seemed almost to loiter along as they slowly trickled up to Burka, but towards sunset they took the redoubt, and we knew that the Turkish attempt to stand on their prepared line along wadi Sukereir had failed.

(To be continued.)

MUKHTESAR.

A BRIEF VISIT BY "TOTEM."

DURING a duty tour to Almora, as an after-result of a lecture given to officers that morning, conversation at lunch in Mess took a semi-scientific turn. As a natural outcome of this conversation mention was made of the Imperial Veterinary Research Institute situated at Mukhtesar, a neighbouring hill top easily visible from Almora towards the south-east.

Several of the officers of the regiment had been there for a visit, and spoke most enthusiastically of the way the Institute was run and of the wonders which had there been seen. The writer had several times before heard the place described and had intended to go some time. The conversation so kindled the enthusiasm of the surgeon that he suggested a trip to the hill top forthwith, and the writer fell to the suggestion, especially as the Colonel described the journey as an easy afternoon's walk which he had done in about two hours. On being pressed for actual distance an admission of "perhaps a little over twelve miles" was obtained. A pessimist said it was a long way down one khud and twice as far up another. However, enthusiasm had been kindled and the trip was decided on for the next afternoon. Fortunately the surgeon had the forethought to get the promise of two ponies to meet us at the bottom of the hill for the return journey the following day.

A telegraphic reply from the Director of the Institute giving permission to occupy the visiting bungalow finally settled the matter.

Bedding rolls and kit having been despatched early next morning by coolies, accompanied by the surgeon's bearer, the surgeon and the writer set off gaily and blissfully after lunch for the easy afternoon's walk.

The first portion was an easy four and a half miles down to the valley of a large tributary of the Kosi river, where the bridle path crosses by a suspension bridge in a fine rocky gorge, and subsequently a steady five miles up hill brought us to the parting of the Mukhtesar and Naini Tal bridle paths, the latter over the ridge to the valley on the right, the former beginning to soar skywards, with an unsympathetic milestone which stated, Mukhtesar five miles.

After a brief halt we recommenced the easy walk, and found that for the next two miles the pessimist's forecast was fully justified. We were incidentally on the sunny side of the hill, and the July afternoon sun even at that height made the writer realize the full force of his own remarks during the previous day's lecture on the subject of water consumption and heat control. The irony of it was that in the lecture he had insisted on the necessity for replacement of the lost fluid after a seven and a half miles march, and now after eleven miles stiff hill walking under a July sun he could find no water available except some muddy pools in a cholera-

infected district, and perforce had to forego replacement of the lost fluid.

The path, however, became somewhat easier up a ridge, but the ridge appeared to lead up and up to a pleasantly tree-covered crag which eventually proved to be the goal of the trip. On finding a small clear stream, the thought of this crag was too much for the writer, who, oblivious of lectures and cholera notices, replaced his lost fluid to the full.

However, the weary climb finally ended at a most comfortable visiting officers' bungalow, with a view of the Institute spread before it. (Note: permission to occupy this bungalow should be obtained from the Director beforehand.)

During the night the monsoon got busy several times, and next morning there was nothing to be seen at first except a grey bank of cloud all round. However, this cleared away later and we got a good view.

The general appearance of the place is a hill-top ridge, with two principal spurs forming a horseshoe looking North; the Institute buildings being situated on the eastern spur and the visiting officers' bungalow on the western. Officers' bungalows, those of the staff, and numerous subsidiary buildings, could be seen through the trees scattered over the whole ridge. The houses (we heard they were like palaces) of the Director and the senior staff are on the southern aspect of the hill. The place used to be a Government fruit farm, so that even now magnificent fruits, in the shape of apples, peaches and apricots, are abundant in the gardens.

We set off on the half mile walk round the horseshoe along the well-kept paths to the Institute, where we found that we had unfortunately hit on a holiday for the day of our visit. However, part of the time of waiting was passed in an interesting discussion with one of the junior staff on *Bacillus abortus*, *Micrococcus melitensis* and some demonstrations of an experiment on the preservation of sera by various antiseptics in lieu of the phenol group. The remainder of a somewhat lengthy time of waiting was passed in the library. This is a fine and an extensive one and appears to take in all the available scientific literature.

On the arrival of the Director, Doctor J. T. Edwards, we were taken round the "grand tour." Unfortunately, owing to a misunderstanding, the Director did not realize at first that his visitors were medical men and started off on the usual layman's tour and explanation. However, when the mistake was rectified we had a delightful exposition of the recent work on his pet subject of rinderpest and its prevention.

The main building of the Institute was roughly a set of four laboratories on the upper floor, a general cooking room, incubator, library and offices on the ground floor. Across a paved courtyard is the second building where the antirinderpest serum is prepared, bottled and packed. The whole Institute is fitted with electric light and gas. There is said to be a magnificent view of the snows from the main block of the Institute.

The laboratories upstairs consist roughly of:—

(1) Entomological and epidemiological laboratories. We saw a good

collection of Tabanidæ, Stomoxys and other blood-suckers which were up for identification.

(2) The Director's laboratory, where all the recent research work on rinderpest is being carried on. The Director is a great believer in the minimum amount of elaborate glass equipment, as he considers that every expert should manufacture his own glass requirements from requisite glass tubing, after the French fashion.

This is all very well for a laboratory which is self-supporting and does not lack for funds, electric light or gas; but imagine the average brigade laboratory having to make its own glass-ware with the aid of an indifferent methylated lamp.

(3) A large teaching laboratory and lecture room which is in course of reconstruction.

(4) The pathological and bacteriological laboratories, where we were shown such items of interest as *Piroplasma canis* and *gibsoni*; cultures of *B. abortus*, *melitensis*, *faecalis alkaligenes*, and tubercle of various strains.

Downstairs the cooking room is a general utility manufacturing room. A gas peep-light continually burns in here connected with the main incubator, so that any one passing can see that the heating for the incubator is correct.

The incubator is a room, furnished with shelves round the sides and in the centre, and can evidently accommodate a very large quantity of material.

Particularly noticeable were many flasks with massive growths of tubercle of various strains.

The serum department on the other side of the courtyard is a most impressive place, showing efficiency, thoroughness, and economy, and sheds great credit on Doctor G. P. Goffi, the head of the department. The main part of it is purely a manufactory and is the main source of the abundant income which enables the Institute to show a profit of some four lacs of rupees in its annual budget. It seems amazing that a scientist of Dr. Edwards' distinction should have to expend a considerable portion of his time in the purely business management of a manufacturing concern.

The chief product is antirinderpest serum. The infective blood is kept going in a series of sheds to the east of the main building. Some 2,000 hill bulls a year are used for this purpose. Supplies of virulent blood are despatched to Bareilly on the plains. There herds of suitable cattle are collected and inoculations carried out with virulent blood and antitoxic sera. From the inoculated cattle, after about eighteen to eighty days, the requisite immune blood is obtained. This blood is despatched in petrol tins from Bareilly up to the Mukhtesar Institute, by rail to Kathgodam and by cooly transport for the forty-mile hill journey.

At the Institute, in this serum department, the blood is centrifugalized in a set of nine large electrically driven centrifuges, very carefully sorted out for strength and stocked in large tanks of varying strengths. From these it is filled into pint bottles, resembling beer bottles, holding 250 cubic

centimetres of serum or fifty doses per bottle, by a semi-automatic filler, in much the same manner as a syrup filler in a soda-water factory. Finally the bottles are closed with crown corks. Different coloured corks and labels are used for the different strengths of brew, so that there can be no mistake as to the dosage for particular sets of cattle to be immunized by the poorly educated provincial veterinary subordinates who carry out this work.

The bottles are then all packed in stout wooden cases and, after copious stencilling with names and addresses, are despatched to their multitudinous destinations all over India.

The serum is sold at the cheap rate of three annas a course and yet gives the satisfactory profit already mentioned. The packing and despatching sheds resemble large business premises rather than a scientific institute. Some 10,000 cases of sera, or 140,000 bottles, were despatched last year and over 600 coolies are employed permanently on these transport duties.

In another portion of the serum department work is being done on the production of dried sera by means of dehydration with calcium salts and mild heat. If the final results are as satisfactory as is anticipated the method should be of great value for the despatch and preservation of sera of all kinds.

Unfortunately, time was pressing, and it was already past the hour at which it had been decided that we ought to leave. The writer had an engagement for a dinner party in his own house at Ranikhet that evening, and so, well after the settled time, we reluctantly tore ourselves away for a rapid lunch and the return journey. One of the chief objects of the writer's visit was to inquire into the relative frequency of tuberculosis in cattle in India, but it was not until it was too late that we discovered that the laboratory of Dr. Soparkar, who is working on the whole question of tuberculosis in cattle, is situated up on the hill some distance from the main institute. We were therefore unable to visit this laboratory, but Major Stelling, late Royal Army Veterinary Corps, who is loaned from the Central Provinces Government to officiate for a leave vacancy, very kindly discussed the question and gave his opinion, founded on what appeared to be an extensive experience. It appears that tuberculosis is much more common in cattle in India than is usually believed, and that its tendency is to take the septicæmic form rather than the usual glandular or rather easily visible form.

The journey back was without marked incident. Ten miles to the bridge in the gorge done in two and a quarter hours made us very thankful for the horses which took us up the hill to Almora. Here the writer found his car ready loaded up and easily managed to drive the thirty-three miles journey in time for the dinner party.

Thus ended a most instructive and enjoyable trip, which must certainly be repeated at some future date, but with more time to spend at the place. A visit to this interesting institute is strongly recommended to any who may find themselves at Almora, Ranikhet or Naini Tal, and with leisure for a three to five days' walking trip in the country.

NOTES ON MALARIA IN MAYMYO.

By COLONEL V. J. CRAWFORD, D.S.O.

WHEN I took over the duties of Assistant Director of Medical Services, Burma Independent District, early in January, 1925, I was struck by the fact that, while, of the four stations in the district occupied by troops, Mandalay, Rangoon and Port Blair were practically free from malaria, Maymyo, on the other hand, showed a high admission ratio for this disease amongst Indian troops, and by no means a negligible admission ratio amongst British troops.

On inquiry it was found that all malaria admissions to hospital at Maymyo from the Indian troops were classed as "relapses" (imported), but amongst British troops "fresh" infections contracted in the station were recognized and diagnosed as such.

The general opinion amongst old residents of the station and civil practitioners was that Maymyo was practically non-malarious.

The situation, however, required to be more clearly defined, and it is considered that the results of the investigations carried out and the action taken thereon may be of interest to the officers of the Corps who find themselves faced by a similar problem.

INFORMATION.

Maymyo (3,500 feet) is a semi-hill station situated on a plateau in the Northern Shan States, it is 423 miles from Rangoon, and about forty miles from Mandalay. The annual rainfall is about sixty inches, spread over the period June to November. From May to October the mean temperature runs about 70° to 74°.

During December, January and February, the mean temperature is about 57° to 58°; the nights are cold and the weather is healthy and bracing.

During the rainy season vegetation grows very rapidly, and streams arise in nullahs and courses which are quite dry for the other six months of the year. The British infantry lines are surrounded by a network of perennial streams. The Indian troops' lines are, on the whole, drier and, being situated on rising ground, have better natural drainage than the British infantry lines, in which a large number of kutchra drains are necessary. A distance of three miles separates the two lines. Generally speaking, the conditions of climate and surface drainage may be regarded as suitable for mosquito breeding during the rainy season.

The composition of the garrison is approximately as follows :—

INDIAN TROOPS.

- (1) Training Battalion (10/20th) of 20th Burma Rifles.
- (2) One active Battalion of 20th Burma Rifles.
- (3) One Indian Pack Battery, R.A.
- (4) One Machine Gun Platoon of the British Infantry Battalion.
- (5) A Mule Transport Company.
- (6) Details.

The total strength of the above is approximately 1,750.

BRITISH TROOPS.

- (1) The British Infantry Battalion.
- (2) A few details, Staff, Departments, etc.

The Burma Rifles, up to the beginning of 1925, were recruited from Chins, Kachins, Shans, Burmans, and Karens, but are now solely recruited from Chins, Kachins and Karens. Of the latter three races, Chins and Kachins are known to live in notoriously malarial hill tracts; Karens, on the other hand, come from the plains of Southern Burma, and are not so highly infected.

The following tables, compiled by Major G. Wilson, Deputy Assistant Director of Hygiene, Burma District, summarize the information which was obtainable regarding malaria amongst the troops, and also show the figures for 1925 and 1926 to indicate the results obtained by the line of action adopted in April, 1925.

In amplification of these tables the following statements are important:—

(1) Anopheline vectors although present in the station were, despite careful routine search, found at irregular times, and then in very small numbers and only in the rainy season. During 1924-25-26 anophelines have been found on three occasions only in the Indian lines.

(2) A study of the malaria admissions for Indian troops showed that an increase invariably coincided with the arrival of new batches of recruits for the Training Battalion (10/20th) Burma Rifles, or the return of batches of leave men of the Burma Rifles.

(3) The Deputy-Assistant Director of Hygiene had made a careful study of the medical aspect of recruiting in the Burma Rifles, and was of the opinion that at least seventy-five per cent of all Chins and Kachins presented for recruitment were infected with malaria. This opinion has subsequently been verified during his tours in the Kachin and Chin Hills in 1925 and 1926 respectively. The chief cause of rejection of recruits was enlarged spleen, but large numbers were being accepted whose general physique was good despite splenic enlargement to the extent of one to one and a half finger-breadths.

DEDUCTIONS.

A review of the above information made it clear that a small amount of indigenous malaria occurred in Maymyo, particularly amongst British troops. The accurate records of Lieutenant-Colonel H. R. Bateman, D.S.O. (Officer Commanding, British Military Hospital, Maymyo, from 1921 to

TABLE "A."—BRITISH TROOPS.

Year	Average strength	Actual admissions		Total admissions	Ratio per 1,000	Remarks
		Fresh	Relapse			
1916	614	67	40	107	174.2	1/4th Border Regiment (T.F.) <i>A. culicifacies</i> <i>A. rossi</i> <i>A. fuliginosus</i> <i>A. stephensi</i>
1917	980	42	39	81	82.62	1/4th Border Regiment (T.F.)
1918	859	111	120	231	268.9	1/5th Hants Regiment, arrived from Agra in January already heavily infected. Detachment of Garrison Bn. Royal Irish Fusiliers. Heavily infected in Southern Shan States
1919	224	18	41	59	263.3	Royal Irish Fusiliers till May Attached Section
1920	573	81	48	129	225.10	2nd Bn. King's Own Royal Lancs. Regiment from U.K. Infected in camps
1921	681	39	36	75	110.1	2nd Bn. King's Own Royal Lancs.
1922	584	58	15	73	125.0	1st Bn. South Staffordshire Regiment from Singapore 24 fresh cases in Maymyo 34 fresh cases camp infections
1923	771	40	28	68	88.19	1st Bn. South Staffordshire Regiment 25 fresh cases in Maymyo 15 fresh cases in camps
1924	773	52	25	77	99.61	1st Bn. South Staffordshire Regiment 33 fresh cases in Maymyo 19 fresh cases in camps <i>A. rossi</i> <i>A. listoni</i> <i>A. fuliginosus</i> <i>A. sinensis</i>
1925	687	19	17	36	52.4	1st Bn. South Staffordshire Regiment 15 fresh cases in Maymyo <i>A. listoni</i> . <i>A. sinensis</i> . <i>A. fuliginosus</i> . <i>A. maculatus</i>
1926	630	30	17	47	69.11	1st Bn. Queen's Own Cameron Highlanders 25 fresh cases in Maymyo <i>A. minimus</i> . <i>A. rossi</i>

TABLE "B."—INDIAN TROOPS.

Year	Average strength all Indian Troops	Average strength 10/20th Burma Rifles	Average strength Active Bn. Burma Rifles	Total admissions			Ratio per 1,000			Remarks
				All Indian troops	10/20th Burma Rifles	Active Bn. Burma Rifles	All Indian Troops	10/20th Burma Rifles	Active Bn. Burma Rifles	
1916	1,695	..	..	168	..	..	99.1	..	..	1/10th Ghurka Rifles, 8 months 2/10th " " 4 " from Quetta 22nd Derajat Mtn. Battery Depot 1/10th Ghurka Rifles. from Quetta
1917	2,375	..	..	222	..	..	98.4	..	..	2/10th Ghurka Rifles proceeded to Field Service 26.8.17 32nd Mtn. Battery, from Tonk 70th Burma R., arrived 12.4.17 25th Mule Corps
1918	1,678	..	..	179	..	..	106.6	..	..	32nd Mtn. Battery, till 18.5.18 70th Burma Rifles, till 4.1.18 2/70th " " 5.1.18 to 4.5.18 25th Mule Corps Depot of Gurkhas (M.F.S.)
1919	1,599	..	..	408	..	..	252.03	..	..	Depot Gurkhas (212 cases) 1/73rd Carnatics (from Trichinopoly) Depots { 1/80th Carnatics (150 cases) <i>A. listoni</i> (identified)
1920	1,325	..	..	174	..	..	181.3	..	..	Depot Gurkhas (151 cases) 1/80th Carnatics, till 22.1.20 62nd Coy. Burma S. and M. 25th Mule Corps. 5/70th Burma Rifles (1 month)
1921	1,028	..	..	192	..	..	186.7	..	..	3/70th Kachin Rifles, 1.1.21 to 31.12.21 (121 admissions) 2/70th Burma Rifles, 3.10.21 to 31.12.21. 4/70th Chin Rifles, 1.12.21 to 31.12.21. Depot Gurkhas. 41st Pack Battery
1922	1,920	67	1,289	180 (92 clini- cal)	8	118	93.75	..	..	11th (41st) Pack Battery 3/20th Burma Rifles, 11 months 4/20th " " (Chins) formed at Maymyo 10/20th Burma Rifles, 1 month Det. 18th Pack Mule Corps
1923	1,967	810	578	156 (54 clini- cal)	55	64	79.3	..	..	11th Pack Battery 3/20th Burma Rifles 10/20th " " Details
1924	1,753	629	678	331 (103 clini- cal)	138	127	188.81	219.39	181.31	11th Pack Battery 3/20th Burma Rifles 10/20th " " Details

TABLE "B."—INDIAN TROOPS—continued.

Year	Average strength all Indian troops	Average strength 10/20 Burma Rifles	Average strength Active Bn. Burma Rifles	Total admissions			Ratio per 1,000			Remarks
				All Indian troops	10/20th Burma Rifles	Active Bn. Burma Rifles	All Indian troops	10/20th Burma Rifles	Active Bn. Burma Rifles	
1925	1,792	778	524	245 (68 clinical)	154	55	136·71	197·74	104·96	111th Pack Battery, departed 10.3.25 114th Pack Battery, arrived 1.3.25. 10/20th Burma Rifles Mule T. Company 3/20th Burma Rifles, departed 3.11.25 2/20th Burma Rifles, arrived 23.11.25, from Taiping <i>A. maculatus</i>
1926	1,483	687	420	160 (12 clinical, 21 fresh)	86	26	107·88	111·69	61·90	114th Pack Battery 2/20th Burma Rifles 10/20th " " Mule Corps " " <i>A. listoni</i>

TABLE "C."—TRIBAL INCIDENCE.

Tribe		Total admissions			Ratio per 1,000 of tribal strength		
		1924	1925	1926	1924	1925	1926
Chins	Active Battalion	44	14	12	287·58	137·2	86·95
	Training Battalion : 10/20th	29	27	29	211·67	170·73	172·61
Kachins	Active Battalion	61	34	5	165·31	119·46	39·06
	Training Battalion : 10/20th	68	97	37	384·18	263·29	120·91
Karens	Active Battalion	22	5	7	135·80	45·04	63·06
	Training Battalion : 10/20th	6	18	18	45·11	88·72	57·26

TABLE "D."—INCIDENCE BY SERVICE IN 10/20TH BURMA RIFLES.

Year	Number of new recruits	1 month	2 months	3 months	4 months	5 months	6 months	7 to 11 months	1 year and over
1924	569	62	22	9	4	7	3	1	28
1925	921	66	22	10	11	5	5	8	22
1926	826	28	7	7	5	10	1	26	

1924) left no doubt as to whether infections amongst British troops were contracted in camps outside the station or while men were actually serving in barracks.

The question of malaria amongst Indian troops presented more difficulties. Here we had undoubtedly a highly infected population; malaria "relapses" were apparently accepted as a necessary evil amongst the Burma Rifles. Admission to hospital followed by a post-hospital quinine course on discharge was the rule of the day.

Owing to language difficulties it was extremely hard to extract a reliable history from any patient admitted to hospital, and this increased the tendency to diagnose "relapse" in every case. In reviewing the Indian figures for previous years the low admission ratio per 1,000 for 1923 was outstanding. During this year 109 cases (fifty-four diagnosed clinically) were admitted to hospital. An investigation of the other causes of admission to hospital during the year elucidated the fact that the ratio per 1,000 admissions for other respiratory diseases was 138·7 per 1,000 as compared with an average of 46·50 for the years 1916-17-18-19-20-21-22-24, this despite the fact that there were no abnormal weather conditions or other factors to account for this increase. It is considered that a large number of these admissions were in reality malaria. It was obvious that since Burma Rifles units had been in the station a steady high admission ratio for malaria was obtained. I had no doubt that the great majority of admissions for malaria from Indian troops in this station were "relapses" occurring in recruits and leave men, but at the same time considered that "fresh" cases occurred, contracted in the station, just as undoubted cases were occurring amongst British troops, and to a comparable extent.

Owing to difficulties in obtaining a medical history from uncivilized patients, aided perhaps by the "relapse" obsession on the part of medical officers concerned, the fresh cases were to my mind being overlooked and diagnosed "relapse." The presence of highly infected troops in the station, and of anopheline vectors from time to time, appeared to me to present ideal conditions for the spread of malaria during those periods of the year when climate and temperature were favourable for the development of the malarial parasite in the mosquito. The factors which prevented a greater indigenous spread in Maymyo are referred to in my conclusion.

It is obvious from what has been stated that the problem in Maymyo resolved itself into:—

(A) The control of mosquito breeding in the vicinity of British and Indian lines.

(B) The prevention of relapses amongst the highly infected population of the 10/20th Burma Rifles and the Active Battalion of the Burma Rifles.

ACTION TAKEN.

Problem "A" presented no difficulties: in previous years clearing of vegetation from kutchra drains, the use of cresol as a larvicide, the fumigation

of barrack-rooms with cresol vapour, and the drainage of residual water where possible had been employed. In 1924 the antimalaria measures were re-organized to the extent of allocating definite unit areas of responsibility in which all antimalaria work was carried out by unit labour supervised by the officer in medical charge. It was found, however, that a coolie squad was necessary to assist in carrying out jungle clearing and drainage in certain areas, the performance of which by unit labour would have interfered considerably with their training and other duties.

The general supervision of antimalaria measures in the station was carried out by a specially selected officer, and the co-operation of units was ensured by periodical meetings of the Station Antimalaria Committee, composed of Officers Commanding Units, the Assistant Director of Medical Services, a representative of the Engineer Services, the Station Staff Officer, and the Antimalaria Officer, the whole being presided over by the General Officer Commanding, as Officer Commanding Station.

Briefly, it was found sufficient in Maymyo to keep all kutchra drains and streams in close proximity to barracks free from vegetation, to oil or cresol stationary water which could not be drained, and to carry out minor drainage works as occasion arose. These measures, supplemented by the careful use of mosquito nets in barracks and in camps, have reduced malaria amongst British troops in Maymyo to trivial proportions.

Problem "B."—In April, 1925, orders were issued that all Chin and Kachin recruits joining the Training Battalion Burma Rifles, and all men in 10/20th Burma Rifles (T. Bn.), and in the Active Battalion Burma Rifles returning from leave were to be placed on a two months' course of quinine treatment. Karens were not put under treatment, and have furnished a control in this experiment. The course of treatment consisted of 10 gr. of quin. sulphate with citric acid daily, a rest being given on Sundays. A bi-weekly dose of purgative medicine was also administered. This system has been adhered to since April, 1925, and the co-operation of the units concerned has been whole-hearted.

The following figures indicate the results obtained :—

	Ratio per 1,000 admissions for malaria			
	1924		1925	1926
Training Battalion Burma Rifles and Active } Battalion Burma Rifles combined .. }	202·75	..	160·52	.. 101·17

CONCLUSION.

Problem "A" calls for little remark, the expenditure of Rs. 750 to Rs. 1,000 per annum on antimosquito measures in the neighbourhood of barracks, principally in keeping streams, drains, and nullahs properly cleaned and free from vegetation, appears to control anopheline breeding in the station. During the rainy season, the very frequent downpours flush the streams, nullahs, etc., and dispose of larvæ.

The close proximity to barracks of dense jungle calls for remark. With

the exception of extensive clearing for a distance of a mile or more, one would hesitate to tackle ravines and watercourses on a *small* scale, especially in view of the fact that *A. maculatus* has been found on two occasions in the station.

In short, the methods employed at present give results commensurate with the expenditure, and have reduced malaria amongst troops to trivial proportions.

Problem "B."—The line adopted has had a definite measure of success. The numbers of "relapses" have been reduced, and the health of the troops concerned has been improved. The reservoir of infection in the station has been considerably reduced, and is kept under control. The point, however, which I wish to bring out, is that there is often a tendency to undertake large scale antimalaria measures (chiefly antimosquito) without due consideration of the control of imported malaria; in other words, the existence of a reservoir of infection for mosquitoes is often overlooked in the all-absorbing mosquito strafe.



Editorial.

THE MEDICAL DEPARTMENT OF THE UNITED STATES ARMY IN THE WORLD WAR.

FIRST NOTICE.

WE have received Volume VI, which deals with "Sanitation" in the United States, and in the American Expeditionary Forces. Military sanitation is defined as the prevention of disease in armies, and consists in the practical application of the principles of the science of hygiene. Little distinction is made between military sanitation and military hygiene. In recent years, as in many foreign countries, the adjective "sanitary" has been applied to troops and organizations of the American Medical Department, and the four field hospitals and four ambulance companies designed for the collection and care of the wounded and sick of a division in the field are designated the sanitary train. But in this volume the word sanitary is not used in this sense, and connotes hygiene as understood in our army.

The march, the camp, the trench, the crowded transport, and the battlefield brought problems practically unknown in civil life. Furthermore, sanitary considerations of undoubted importance had to be neglected because of military necessity, since war is waged in order to attain a decision of arms, and "not with high ideals of sanitation as its primary object."

It is pointed out that while the civilian public-health official has to take his municipal population as he finds it, the military hygienist is in the happy position of being able to choose the bulk of his human material. The proper selection of recruits constitutes one of the most important means for obtaining satisfactory health conditions and the greatest degree of military effectiveness.

In the American army, as in our own army, medical officers act as technical advisers of their commanders, and are responsible for pointing out insanitary conditions and making proper recommendations for their correction. Direct responsibility, however, rests with the commanders.

The professional training of the services in matters pertaining to sanitation was carried out, prior to the World War, chiefly by the regular courses of instruction given to medical officers at the Army Medical School in Washington, D.C., and at the Army Service Schools, Fort Leavenworth, and by the courses given the members of the Medical Departments in field hospitals, ambulance companies, and detachments.

Hygiene is taught to cadets at West Point, and to commissioned officers

of the army at garrison and service schools, as prescribed by general orders issued from time to time for the regulation of military education in the army.

The Medical Department supplied no sanitary appliances during the World War, though it did supply all of its own scientific apparatus.

Prophylaxis by means of vaccination, typhoid inoculation, etc., had the full support of the American War Office, so that no difficulties were placed in the way of the Medical Department in this respect. Scientific measures having to do with protecting the health of the troops centred in the medical officers of the army, but these officers were notably assisted by scientists in correlated fields. Entomologists and many sanitary engineers were commissioned in the Sanitary Corps and performed most valuable services in their specialities.

When America declared war on Germany, April 6, 1917, no sites had been selected for the mobilization of the new War Army. Barracks existed for the regular troops in numerous small stations throughout the country; these were expanded as far as possible, but inevitably the new armies had to be located on new sites in camps and cantonments. The Medical Department was responsible for advising on the location, and a medical officer was included in the board which selected permanent camps and posts.

The War Department selected many camps in the south, because of the milder climate there—a perfectly good reason for so locating them, both from the military and the strictly sanitary standpoint. But, viewing the camp sites selected in the light of subsequent events, the impression was gained that the camp site *per se* had relatively little influence upon the health of the troops occupying it. Camp sanitation had advanced to a point where any site in the country likely to be chosen could be rendered healthy, provided the necessary funds and labour were available for the purpose. Apart from the pecuniary aspect of the question, the disadvantages of a malarious camp site were the waste of time consumed by soldiers in ditching and policing which might otherwise be spent in military drill and instruction, the diminution in man power as represented by civilian labourers employed, and the physical discomforts experienced by troops occupying localities heavily infested by mosquitoes.

When in camp the troops occupied tents, and in cantonments mainly buildings.

The plans for cantonment construction contemplated rough one-storey structures, twenty feet wide, and built in different lengths to accommodate units consisting of varying numbers of men; for example, they were designed for 37, 43, 49, 55, 61, 67, 73, 79, 85, 91, and 97 men respectively. This type contained no means of ventilation save through sliding windows, 34 by 37 inches, arranged at intervals of 7 feet, and when filled to authorized capacity allowed each soldier only 27 square feet of floor space and about 291 cubic feet of air space.

Later on the following changes were recommended: Full length ridge ventilation in all buildings; air inlets under windows to deflect the air-

current upwards ; higher side walls, and screened ventilators and windows. Where feasible, sections of the walls on each side of every dormitory were to be placed on hinges, so that they could be raised, thus converting each dormitory practically into an outdoor sleeping porch. It was thought that with such an arrangement these cantonments might, after the war, be used as great tuberculosis camps, and would not become useless when no longer needed by soldiers.

A Medical Board appointed by the Secretary of State on June 14, 1917, recommended that the unit to be housed in each barrack be reduced to thirty. As regards air space, the minimum which is consistent with safety should be 500 cubic feet, with not less than 40 square feet of floor space, and preferably 45 feet. A separation of at least five feet between the heads of the occupants should be maintained.

For enlisted men the large pyramidal tents used had formerly been considered of sufficient size to accommodate eight men, and even twelve in emergency for short periods. They could be well ventilated by rolling up the sides and throwing back the cowl at the peak of the tent.

The pyramidal tent when framed and floored was about 16 feet square, its walls were about $6\frac{1}{2}$ feet high, and its peak was $15\frac{1}{2}$ feet above the floor. It provided 256 square feet of floor space and approximately 2,775 cubic feet of air space ; with eight occupants it allowed 32 square feet and 348 cubic feet *per capita*. With twelve occupants the air space was reduced to 231 feet *per capita*. If the tent was not framed, the wall was only about three feet high, and consequently the cubic air space was much less than that given.

Changes were found necessary in the method of ventilating cantonment barracks. As already stated, the first set of plans designed for cantonment construction provided no means of ventilation except by windows. This was the type of building used along the Mexican border from 1914 to 1917.

Full ridge ventilation was recommended by the Surgeon General, but was suitable for one-storey buildings only. When the erection of two-storey barracks at the large cantonments was decided upon, plans were made for installing ventilating shafts for the lower stories.

The original type of ridge ventilation had the disadvantage of offering insufficient protection against cold, rain, snow, or wind, and, as might have been expected, was the source of numerous complaints from occupants of this type of barracks. To overcome this objection baffle boards were placed on all roof ventilators. This alteration afforded inadequate protection, and complaints were still received. Hence, in October, 1917, shutters were added, which made it possible to close the ventilators from the inside by means of a pulley and rope. The design provided a double shutter, one for either side of the ventilator, each controlled by a separate rope. This plan frequently resulted in both shutters being closed tight during inclement weather, with absence of all ventilation except by windows.

In August, 1918, after a long series of conferences between representatives from the Surgeon General's office and from the construction division, a standard ventilator made of steel or wood was adopted.

"It was originally contemplated by the Quartermaster Department that soldiers in cantonments should be provided with double-deck bunks." With the forty to fifty square feet of floor space per man, the use of ordinary beds produced considerable crowding, and usually there was a tendency to group beds close together along the sides of a dormitory and leave a large vacant space in the centre. This tendency, and the still more dangerous practice of arranging beds in groups of two or four in actual contact, had to be constantly combated by the sanitary inspectors. At times when sputum-borne diseases were prevalent, particularly during the epidemics of measles and influenza, the cubicle system was employed at many camps, a screen made of a sheet, a strip of muslin, or a shelter tent half, being placed at night between two adjacent sleepers with a view to limiting droplet infection in coughing or sneezing.

America had never before been confronted with the problem of mobilizing such a great number of absolutely untrained men in so short a time as became necessary when war was declared on Germany.

Men began to arrive at the camps before proper accommodation had been arranged, and during the entire war the housing provided at most stations was generally insufficient for the number of soldiers present. Constructional work did not keep pace with the streams of drafted men; consequently, despite the strongest objections on the part of the Medical Department, overcrowding was frequent, with the result that when once an infection was introduced into a barrack the opportunities for its rapid spread were exceptionally favourable.

At the date of the declaration of war with Germany the strength of the U.S. Army was approximately 120,000. This number had increased by the end of 1917 to 1,538,203, and up to the date of signing the Armistice 4,000,000 men had been enrolled for military service. These men came from all ranks of life, from the town and from the country. Most of the men had a very limited knowledge of personal hygiene, and in many instances had been exposed to one or more of the exanthemata, and some were actually in the incubation period of an infection when they arrived at their station. Men from rural districts had not been exposed to these diseases and had acquired little immunity. The winter of 1917 was exceptionally cold, the huts were not properly furnished, the men were overcrowded, and blankets were deficient. In these circumstances it is not surprising that there occurred serious epidemics of measles, mumps, scarlet fever, meningitis and pneumonia.

The usual precautions were taken, but it was soon recognized that it would be impossible to prevent the occurrence of communicable disease unless special measures were taken to segregate new arrivals in camp for a period of at least two weeks. The Surgeon General recommended that

detention camps consisting of small huts to house eight men should be formed. Carriers of disease detected in a detention camp were sent to a quarantine camp located near a base hospital.

The death-rate in the army was higher than that of any city with which the rate for the same age-group was compared, with the single exception of New Orleans. When compared with the statistics of the registration area of the United States, it was found that while the older age-groups had higher rates, all the rates below age 49 were lower in civil life than in the army. The higher morbidity and mortality in the camps was not due to faulty sanitation, as that term is generally understood; the camps were clean, had unquestioned water supplies, and garbage and sewage were satisfactorily disposed of. The diseases which were responsible for the greatest number of deaths were the so-called respiratory infections, and of those the most important in every respect was pneumonia. The investigations were believed to indicate that natural susceptibility and lack of knowledge of the fundamental laws of sanitation had much to do with the sickness among the men. For example, spitting was promiscuous. Aggravating factors were exposure, fatigue, lack of warm clothing, cold quarters, and insufficient bedding by night. The case mortality-rate for all troops for the six months' period was 23 per cent from pneumonia, 27 per cent from meningitis, and 1.1 per cent for uncomplicated measles. Most numerous as cause of sickness were those less immediately fatal ailments, such as colds, influenza, bronchitis, and mumps.

The army rations authorized in 1908 and used in the Mexican mobilization in 1912 were still in force when the United States entered the war in 1917. These rations consisted of: Beef 14 ounces, bacon (substitute) 3.6 ounces, flour 18 ounces, beans, etc., 1.2 ounces, rice (substitute) 0.8 ounce, potatoes 14 ounces, onions, fresh vegetables (substitute) 4 ounces, preserved fruits and jam 1.28 ounces, sugar 3.2 ounces, milk (evaporated) 0.5 ounce, lard 0.8 ounce, butter or oleomargarine 0.5 ounce, syrup 1.78 ounces, tea or coffee and spices. The calorie value of the ration was 4,757. Observations carried out in 277 messes in the United States showed that the whole of this ration was not consumed, and the food actually supplied contained less meat and flour and more beans, rice, fruit, milk and butter. It had a calorie value of 3,422. A new "training ration" was therefore issued in 1918 which contained: Beef 12 ounces, bacon 2 ounces, flour 10 ounces, cereals 1.5 ounces, beans 2.25 ounces, rice, etc., 1 ounce, potatoes 14 ounces, onions and fresh vegetables 4 ounces, tomatoes 2 ounces, prunes, fruit and jam 1.6 ounces, milk (evaporated) 3 ounces, lard 0.7 ounce, butter or oleomargarine 1 ounce, syrup 0.74 ounce. This ration had a calorie value of 4,243. Nutrition officers were appointed to look after the food supplied, prevent monotonous diets, and diminish waste as far as possible. Food was issued on the "cafeteria" or "line system," when the men received the food in their mess tins as they filed past a counter, or in the "family style," when the men were seated and helped themselves to

food placed on the tables. Under the family style the control of waste was more easily attained.

Details are given of some interesting researches on the dehydration of foods, the chemistry of "meat spoilage," and the chemistry of bread-making. Early in the war it was realized that there might be a shortage of wheat grain, and substitutes might have to be employed. The importance of gluten in connection with bread-making has been known for a long time, but the scientific conditions of its action have never been thoroughly worked out, and a research was undertaken by Dr. C. L. Alsberg and Professor Henderson. The "equilibria" of glutenin and gliadin with various acids and bases were worked out by concentration cell measurements of the hydrogen-ion concentration, with observations on the electrical conductivity and upon the solubility and swelling of the proteins. The essential relation was found to be a salt formation of the amphoteric proteins and a simple acid or base. A study of the colloidal properties of gluten in the presence of a variety of solutions of electrolytes showed that gluten behaves exactly like the proteins of which it is composed. A study of the viscosity of dough indicated that there was a well-marked minimum viscosity at definite hydrogen-ion concentration.

It was found that the addition of weak acids such as lactic or acetic to dough favoured the production of carbon dioxide and consequently the rapidity of rising. By adding a few drops of a weak solution of methyl red to bread, the most favourable acidity can be determined, and this is indicated when the methyl red just turns from orange to deep red.

With substitutes for wheat the bread did not hold together well, but the addition to mixed flours of two to three per cent of dry powdered serum yielded a dough quite as easy to handle as that made from ordinary wheat flour.

The disease known as "rope" was found not to develop when bread had a certain acidity. A safe acidity is indicated by a full red colour of the indicator methyl red. When rope is feared it can be prevented by adding lactic acid to the flour and using methyl red as the indicator.

Under the dehydration of vegetables, it is stated that dehydrated tomatoes and dehydrated citrous fruit juices can be depended upon to prevent scurvy.

The amount of water supplied per head in camp, fifty-five gallons, seems excessive to our ideas, but it is stated that more than double this amount was allowed in the posts of the regular army before the war, and that it was exceeded in most of the large camps. Where possible municipal supplies were used, but in many camps new supplies had to be developed, water being taken from rivers, streams and creeks. Filters were used when necessary to produce an æsthetically satisfactory water, but all surface waters and waters of doubtful quality were chlorinated. Laboratory facilities were provided for determining the quality of the water. More than 100 large, well-equipped laboratories were established, and others fixed and mobile, for water work alone.

Under "health of troops in relation to water supply," there is the significant statement that vaccination against typhoid and paratyphoid fevers does not invariably protect every individual against massive infection, especially when this is encountered in a recently and grossly contaminated water supply. Sanitation must not rely wholly on vaccination.

As with our new armies, the disposal of sewage and waste water constituted a serious problem in the camps in the United States. Sewers were not at first planned in the sixteen National Guard camps because of their supposed temporary nature; waste water was turned into ditches and excreta dealt with in pit latrines.

In March, 1918, a water-carriage system was authorized for all the National Guard camps. In conformity with our experience, camp sewage was found to differ materially from municipal sewage, in that it was much more concentrated and contained large quantities of uncommingled material and practically no trade waste. Where practicable sewage was discharged into streams without treatment. When treatment was necessary septic tanks were provided on a basis of ten gallons per head; trickling filters were added later on a basis of 30,000 persons per acre, and had a standard depth of five feet. Sometimes the effluent from the filters was passed through sand filters, but when these were not installed an automatic chlorinating apparatus was provided and used as required. Chlorination of the septic tank effluent was employed in some cases, so as to avoid the expensive further treatment. This disinfection prevented putrefaction in the immediate vicinity of the camp, but often led to nuisance further down, when the effluent was passed into a stream and was not largely diluted by the body of water present.

The value of garbage at an army camp was early recognized, as it contained amounts of fats, glycerine, alcohol, etc., which commanded abnormally high prices as the result of the war.

Disposal by incineration was considered too wasteful, and arrangements were made for the separation of the garbage into various classes, its storage in covered tins, outside the kitchens, and its removal by military labour to a central disposal station, where it was handed over to contractors. Special equipment was provided at the station for cleansing the garbage tins before return to the kitchen.

The control of malaria was an important problem for the Medical Department, as nearly 800,000 men occupied camps where malaria was endemic. Moreover, it was evident that numerous "plasmodium" carriers would be enlisted from endemic malaria centres, and owing to the movements of troops considerable numbers of such men would be repeatedly introduced into all the camps.

It is estimated that the annual price which the United States pays as a result of "paludism" is more than 100,000,000 dollars. In the Southern States "paludism" costs annually 7 dollars per head, and if 800,000 men were in camps there, an expenditure of 5,600,000 dollars would have been justified, an amount in excess of that actually expended.

A special force was enlisted for malaria work and contained besides medical officers, sanitary engineers and entomologists. The sanitary engineer had a special detachment under his orders, varying from 50 to 300 men, and in addition labour battalions of 500 to 2,000 men were employed.

The antimalaria programme contemplated mosquito elimination, careful screening of the healthy, and screened segregation with prolonged treatment of those suffering from malaria. Prophylactic doses of quinine were not advocated except in special circumstances, when other measures would not be carried out.

Drainage constituted the most important measure for the control of mosquitoes, and after careful surveys the sanitary engineer planned his drainage ditches, not only with a proper grade, but also with due regard to the shape of the cross-section, in order that there might be a proper flow whether in dry weather or flood time, and also that the walls might not wash unduly. While the drainage was being carried out careful oiling proved essential, a mixture of crude oil and kerosene being employed. In a number of camps top-feeding minnows were employed, and the *Gambusia affinis* was found most effective for destroying mosquito larvæ.

In some streams temporary dams with sluice-gates were constructed, enabling the streams to be flushed once or twice a day.

In cantonments the framed barracks were screened, and in camps with tents bed nets were furnished. Adequate screening was regarded as one of the most important features in the control of malaria.

The cost of the malaria campaign was 3,250,000 dollars, and the results were considered excellent. In 1917 there were 4,167 cases of the disease, with only 5 deaths; of the cases 2,132 developed the disease before concentration in the permanent camps took place. In 1918 there were 5,198 cases and 14 deaths among troops in the United States.

The louse problem did not receive much attention in the United States until May, 1918, when complaints were received that more than fifty per cent of the troops arriving in France were infested with vermin. It had been thought that lousiness would not be manifest in the troops in the United States, consequently no special examination for lice was practised, and though there were good bathing facilities in the camps, no means of disinfecting clothing existed, except the large steam disinfectors in the big base hospitals. An examination of drafted men arriving in camp showed that 3.5 per cent of the whites and 26 per cent of the negroes were infested, and it seemed probable that, owing to the crowded state of the transports, lousiness would spread among the troops during the voyage to France. As a result of the investigations carried out, arrangements were made to "delouse" troops scheduled for overseas, an educational campaign was started, and "delousing" plants were constructed all over the States. The plans of the plants were similar to those described in our "Medical History of the War," and before troops were allowed to embark a careful inspection

was made so as to exclude all cases of vermin. After the signing of the Armistice, it was decided that troops were to be detained for fourteen days at foreign ports and deloused before embarking. On board ship a further examination was to be made, and troops deloused when found to be necessary. On arrival in the States, universal delousing was to be carried out in the debarkation camps. From November, 1918, to June, 1919, among 2,500,000 men discharged from the service only 131 were infested.

The sanitation of transports was peculiarly difficult as, just when the call came for a large transport fleet, the world was experiencing an acute shortage of tonnage. Over 1,000,000 men sailed between July and October, 1918, and prior to the signing of the Armistice over 2,000,000 men had been sent to the American Expeditionary Force.

The three basic factors which governed the transportation of troops were the shortage of ships, the supreme necessity of transporting as many troops as possible in the shortest time, the relatively short duration of the trip during which the troops would have to submit to discomfort. Despite the fact that the ships were already overcrowded according to our ideas, the loading was increased by fifty per cent during the summer months, and troops were divided into two watches, known as day and night sleepers. During the pandemic of influenza the overcrowding was reduced, and after 100 deaths had occurred on the s.s. "Olympic" the reduction gradually reached as much as seventy per cent, but this was also influenced by other factors determining the flow of American troops to the Expeditionary Force.

The ultimate selection of physically fit men for the service devolved on the Medical Department. During the greater part of the war there was one physical standard for voluntarily enlisted men and another for the larger selective group. About 530,110 men joined the Regular Army, and 461,000 the National Guard by voluntary enlistment; 189,606 men also enlisted in the National Army and Enlisted Reserve Corps, making a total of about 1,000,000 men who joined by voluntary enlistment, some 28 per cent of all the men who served with the colours.

The minimum standards for general acceptance were for men 21 years and over: height, 64 inches; weight, 128 pounds; chest measurement, 30 inches, mobility, 2 inches; vision, right eye, $\frac{20}{20}$; left eye, $\frac{20}{20}$. The same standards applied to men below 21 years, except that the figures for height and weight were lower.

As in the Civil War, an official called the Provost Marshal General determined, in the first instance, under the Selective Service Act, which men of the general population were physically fit for the army. These men were then sent to camps where they were medically examined and approved on standards laid down for the army, usually suggested by the Surgeon General. Of the first draft, 2,500,000 men were examined in order to secure 500,000 men for standing camps, as the physical examination was made before exemption was determined on industrial or other grounds. The physical standards for "selective" service men were: height, 61 inches; weight,

110 pounds ; chest measurement, 30 inches ; vision, right eye, $\frac{20}{20}$; left eye, $\frac{20}{100}$.

Syphilis was a disqualification, but not gonorrhœa. Later on, in 1917, men with dentures and men with perforation of the "ear drum" were accepted. It was never contemplated that the high physical standard of the Regular Army should be maintained for selective service men. The Council of National Defence in August, 1917, recommended a lowering of the height and weight standards, so that the provisions of the Selective Service Act might apply in a more normal way to the mixed population of the United States. If the height for the Regular Army were maintained, about one-fourth to one-half of the men belonging to Greek, French, Italian, Mexican, Slav and Magyar nationalities would be excluded from service, and a disproportionate burden would be placed on the taller native American.

The Selective Service Act of May, 1917, prescribed the ages as between 21 and 30 years, but on August 31, 1918, Congress made the age limits 18 to 41 years. Of the men registering under the Service Act, only those subject to immediate call were to be examined, and these were arranged in three classes : (1) Qualified for general military service ; (2) qualified for special or limited military service ; (3) deficient and not qualified for military service. Later on a fourth group, deferred remedial group, was established for men who could be made fit for service, and at one time there were 10,000 hernia cases in military stations awaiting treatment.

In January, 1918, the minimum height was 60 inches, weight 114 pounds, chest 30 inches. About 324,000 men were found physically unfit, either at the camps, or some months afterwards.

We hope to deal with sanitation in the American Expeditionary Forces in a future issue of the Journal.



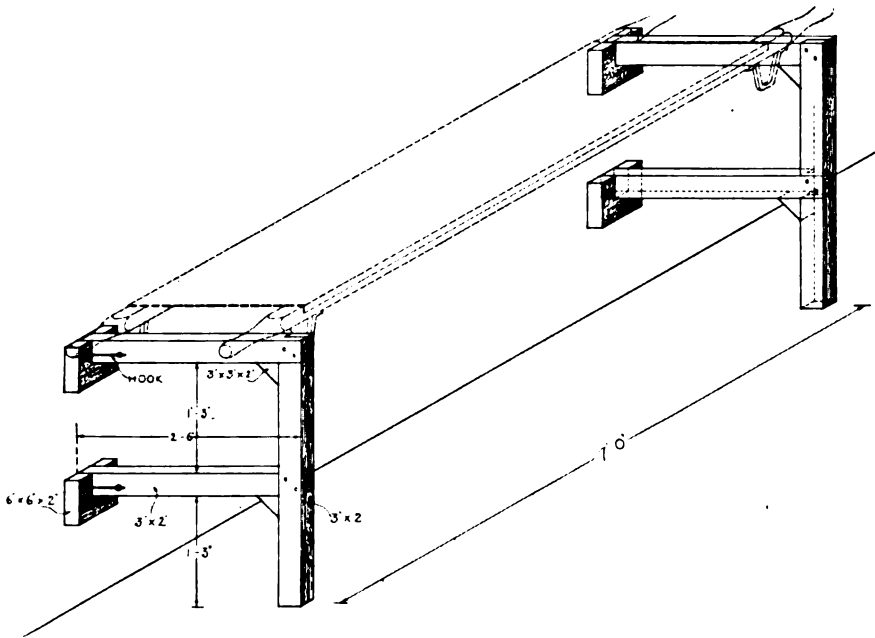
Clinical and other Notes.

A METHOD OF INCREASING THE ACCOMMODATION FOR STRETCHER CASES.

By MAJOR W. STRELLEY MARTIN, M.C.

Royal Army Medical Corps.

VERY often on active service one has been sadly handicapped in dealing with casualties by insufficient accommodation for the "storage," one might call it, of stretcher cases while awaiting evacuation either to an advanced dressing station or from one. Shelter from the weather is sometimes almost as important as shelter from shell fire, and is often just as difficult



Improved "F" shaped stand for stretchers. Note: Dotted lines show position of stretcher.

to get. It was with a view to trying to solve this problem in what I might call a "first-aid" manner that the suggestions here given were first put into practical use.

The method requires a supply of what might be called "F" frames, a firm floor and a wall, and all that is claimed for it is that, with a given floor space, one is enabled to improvise fairly rapidly shelter for three times the number of lying cases that one could house without it.

The accompanying plan shows how the "F" frames are fitted to the wall, and also how they are put together. The frames are simple to construct, and should present no difficulty to almost anyone. They are used in the following manner:—

The first stretcher case is placed on the floor.

The second one is held by the stretcher-bearers directly over the first one until another bearer has placed two frames in position, when he is lowered on to the lower arms of the "F's." The third patient is placed on the upper arms of the "F's."

Cases are removed in the reverse order, the top one being removed first. The second patient is held until the "F" frames have been taken out, and the man on the floor is moved last of all.

Granting that the frames are for use merely as an improvisation and not in any sense as permanent structures, the following advantages may, I hope, fairly be claimed for them:—

(1) They need only be fitted when required, and so there is no permanent obstruction to the floor space such as occurs if bunks are used.

(2) It is an easy matter to load stretcher cases on to them and also to remove patients, another advantage over the bunk method.

(3) Any amateur carpenter can make them, although one can visualize the advantages of having them standardized.

(4) The frames are portable.

I have not said anything in detail about how to fit the frames to a wall, because the plan adopted depends very largely on the type of wall. With a wooden wall, such as one gets in a dug-out, the fixing of the pieces of wood to form the slots in which the arms rest is of course easy. If the wall is of brick, it is not so simple, but it can be done without much trouble by the exercise of a little ingenuity.

I am indebted to Captain G. Whittaker, R.A.M.C., T.A., of No. 8 Hygiene Company, who very kindly made the drawing for me.

A CASE OF SOMATIC INFECTION WITH *CYSTICERCUS CELLULOSÆ*.

BY CAPTAIN W. M. CAMERON, O.B.E.

Royal Army Medical Corps.

THE case is considered worthy of record both on account of the comparative rarity of the condition and on account of the cerebral symptoms exhibited.

HISTORY.

Serjt. "A" was stationed in India from November, 1919, to November, 1921, at Risalpur. He was in good health during this time, and till March, 1922, when he had his first fit. This was mild in character; he felt paralysed and unable to move, but was not unconscious. The fit lasted

about five minutes. At this time he noticed a small nodule in his arm and one in his chest wall. He had a second fit in December, 1922, of the same type, and then remained free until October, 1923, when he had several "fainting attacks." He was admitted to York Military Hospital, where numerous small freely movable bodies were noticed in his muscular and subcutaneous tissues. It was suspected that he was suffering from pulmonary tuberculosis, but after careful investigation this was not confirmed. At this time he had sugar in the urine.

From this time till his admission to hospital in Egypt he had about five fits per year. These started with a general shivering and a cold sweat; he then became unconscious for five to ten minutes, and on waking up felt normal except for a slight headache. He noticed that the fits were associated with mental excitement. In February, 1927, he was admitted to the Citadel Military Hospital, Cairo, owing to the occurrence of frequent fits and general debility. He appeared thin and very nervous. His hands were tremulous, and he stated that for the past two years he had been failing in health, and that he could not now do the same physical or mental work as formerly.

On examination, numerous small nodules were discovered in various parts of the body. These were about the size of a pea, but somewhat oval in shape, hard to the touch, and freely movable under the skin. They were situated for the most part in the muscles of the shoulder girdle and arms, but were found in all parts of the body. A cyst was excised from the pectoralis major and was found on examination to be the *Cysticercus cellulosæ* stage of *Tænia solium*. Examination of the fundi oculi did not reveal the presence of any cysts. Sixty-five cysts in all have been counted.

Blood examinations showed an eosinophilia of about 11 per cent.

Examination of the central nervous system revealed the fact that the arm-jerks of the right arm were difficult to elicit in comparison with those of the left, otherwise the examination was negative. The mental condition, however, of the patient had deteriorated. He was unable to concentrate or do accurate arithmetical calculations. The heart lacked tone, the first sound being definitely faint. As several of the attacks had been very similar to ordinary attacks of syncope it seemed possible that the heart muscle had been invaded.

It was considered that the condition was due to an auto-infection, but numerous treatments with ext. *Filicis mas* and other anthelmintics have been unsuccessful. The condition of the patient is not improving, and treatment is, of course, most unsatisfactory, bromides, arsenic, etc., having no effect on the parasites. The fits have not been of a definitely Jacksonian type, nor are there any other localizing symptoms from which one might deduce the site or sites of the cysts in the brain.

The diagnosis presents no difficulty to one who has seen previous cases, but the case is of interest from the fact that this condition, when it causes

cerebral symptoms, may easily be confused with Jacksonian epilepsy, *petit mal*, or even cerebral tumour.

A second case, Pte. "A," has just recently been admitted to hospital. In this case also the infection—one of a much milder type—was probably acquired in India. The condition is symptomless, and the diagnosis has again been confirmed by an excision of the cyst.

He does not appear to have an active infection with *Tænia solium* and is being returned to his unit where he will be kept under observation.

I am indebted to Lieutenant-Colonel G. J. Houghton, D.S.O., R.A.M.C., for permission to publish the case.

A CASE OF PERCHLORIDE OF MERCURY POISONING.

BY MAJOR J. M. WEDDELL

AND

CAPTAIN W. M. CAMERON, O.B.E.

Royal Army Medical Corps.

PRIVATE X, at 6.30 p.m., on the evening of July 5, 1927, swallowed two tablets of perchloride of mercury, $17\frac{1}{2}$ grains. He had placed these in a mug in order to make up an antiseptic solution, and forgetting their presence poured in a bottle of beer and drank the contents. He vomited immediately, and he thought that the tablets might have been vomited, but these were not recovered. He was seen in the medical inspection room in his barracks at 7.30 p.m. and was given an emetic, mustard and water and the white of three eggs.

On admission to hospital the patient's general condition appeared fairly good, there was no marked collapse, his temperature was 99° F. and pulse was 94. He complained of pain in the throat and mouth and also of acute abdominal pain, but corrosion of the mouth was not a noticeable feature on examination. During the night he vomited bile-stained fluid and passed several watery stools containing blood and shreds of mucus. He was given 0.9 gramme thiostab intravenously and one ounce oleum ricini; six ounces of olive oil and the whites of four eggs were also administered.

The following day the condition of the patient appeared to be satisfactory. His temperature was 99.8° F. and his pulse was about 100. He was still vomiting bile-stained fluid, and he passed eight stools. Two ounces of urine were passed. He was placed on a diuretic mixture. On the 7th he appeared to be improving, the vomiting, diarrhoea and abdominal pains were less severe, but no urine was passed. On the 8th the patient was catheterized, but no urine was obtained. Another injection of 0.9 gramme of thiostab was given intravenously, the loins were poulticed, and diuretics, caffeine citrate and potassium citrate were given in large

doses. During the evening his temperature rose to 101°F. , and he complained of headache. Until this period the progress had seemed favourable, the acute symptoms had been subsiding and the patient was quite comfortable, but the disquieting feature of the case was the complete anuria. From the 9th, however, it was evident that uræmia was becoming the dominant feature in the case. On that day he complained of headache, vomited repeatedly and showed signs of air hunger. The dose of 0.9 gramme thiostab was repeated, and an intravenous injection of one pint of $2\frac{1}{2}$ per cent glucose in saline followed by a radiant heat bath was given.

On July 10, 1927, thirteen cubic centimetres of urine were obtained, and this was found to be loaded with albumin and showed numerous hyaline and granular casts. As the vomiting was becoming worse, he was given two pints of saline by a rectal drip feed. Venesection was performed and six ounces of blood withdrawn and one pint of $2\frac{1}{2}$ per cent glucose in saline injected.

Blood-urea was 110.8 milligrammes per 100 cubic centimetres.

As the patient, in spite of treatment, was showing symptoms of an advancing uræmia, the operation of decapsulation of the kidneys was decided on, and large doses of alkali were given to decrease the acidosis. On the 11th the blood-urea before the operation had risen to 132.4 milligrammes per 100 cubic centimetres.

Operation, July 11, 1927.—Anæsthetic: chloroform and ether mixture. The right kidney was exposed by the angular lumbar incision (Thomson-Walker) and delivered on the loin. The capsule was split along the convex border and stripped down both sides of the kidney to the hilum. The kidney was definitely larger than normal, the capsule very thin and the kidney tissue œdematous and very friable. A gauze drain was inserted down to the kidney and the wound closed. The left kidney was exposed by a similar incision and an attempt made to deliver it on to the loin. As this was difficult, as much of the capsule was stripped down as possible. The general condition was similar to that of the right kidney, except that the enlargement was not so marked. Ten ounces of glucose, $2\frac{1}{2}$ per cent were injected intravenously. The whole procedure took fifty-five minutes. The condition of the patient was fair at the finish. He was put back to bed. Sodium bromide twenty grains in ten ounces normal saline were given *per rectum*. The foot of the bed was raised on blocks.

From July 12 to 16 the clinical picture is one of a steadily progressing uræmia, and this in spite of the fact that after the operation the secretion of urine was partially re-established. This can be best seen by a chart of the blood-urea and urine excretion:—

July 12: Blood-urea, 154 milligrammes per 100 cubic centimetres.

„ 13	„ „	191.9	„ „	100	„ „
„ 14	„ „	259.4	„ „	100	„ „
„ 15	„ „	283.8	„ „	100	„ „

July 11: Urine secreted, $2\frac{1}{2}$ ounces.

„ 12	„	„	10	„
„ 13	„	„	10	„
„ 14	„	„	19	„
„ 15	„	„	16	„

The treatment consisted in attempted stimulation of the kidneys with diuretics, caffeine citrate in five-grain doses, pituitrin in one cubic centimetre doses, potassium citrate, etc., and in an effort to remove the toxic blood by venesection and substitute $2\frac{1}{2}$ per cent glucose in saline. On July 14 ten ounces of blood were withdrawn and one pint $2\frac{1}{2}$ per cent glucose injected. On July 15 two ounces were withdrawn and five ounces $2\frac{1}{2}$ per cent glucose injected. Very troublesome hiccough at this point was checked by eserine sulphate $\frac{1}{32}$ grain hypodermically. On July 16 one pint $2\frac{1}{2}$ per cent glucose was given while the patient was in a comatose condition.

During the 16th the patient was in a state of uræmic coma and sank and died at 11.35 p.m.

POST-MORTEM NOTES.

The points of interest were:—

(1) *The Stomach*.—An oval ulcer, $1\frac{3}{4}$ inches by $1\frac{1}{2}$ inches, was present in the anterior wall close to the greater curvature and about 2 inches from the pylorus. The edge of the ulcer was smooth and very thickened. The floor of the ulcer was covered in the centre by blood-clot just underneath the mucous surface. Around this were delicate white bands of fibrous tissue. Very little induration.

(2) *Small Intestine*.—Mostly normal, occasional patches of inflammation.

(3) *Large Intestine*.—Scattered inflammatory patches and a few pin-point hæmorrhages beneath the mucosa.

(4) *Right Kidney*.—Weight $8\frac{1}{2}$ ounces. Very swollen and pale. Cortex somewhat thinned. Cortex and pyramids appeared whitish and friable.

(5) *Left Kidney*.—Weight $8\frac{1}{4}$ ounces. Swollen and pale. Similar in appearance to the right kidney.

Microscopical Appearances.—Cortex: glomeruli normal. Convoluted tubules: very degenerated. The epithelial cells were completely disintegrated and were mostly shed into the lumen of the tubules. Nuclei largely destroyed. Medulla: epithelial cells of tubules degenerated to lesser extent. There was no congestion or infiltration present and no attempt at regeneration of epithelium. Capsule had been stripped at operation.

COMMENTS.

There was a similar case in the hospital in 1926, who died nineteen days after swallowing one tabloid of perchloride of mercury. No operation

was performed. The secretion of urine was re-established up to the extent of thirty ounces *per diem* for nine days ; the blood-urea in this case rose steadily from 82 milligrammes on the tenth day to 160 milligrammes on the nineteenth day, when he died. In this case also thiosulphate treatment (0.9 gramme intravenously for four days) was carried out without any definite improvement.

In the present case, although the secretion of urine had recommenced by the morning following operation, the steady daily rise of the blood-urea proved that no real improvement had been achieved. The condition of the kidney tissue as seen post mortem showed a very advanced state of destruction.

It is not known how soon the ultimate destruction of the kidney tissue is accomplished after the ingestion of the poison, but it is probable that operative treatment should be undertaken (if no definite improvement in the secretion of urine has taken place) forty-eight or seventy-two hours after the ingestion of the mercury.

In the above case also the thiosulphate treatment did not appear to protect the kidneys from damage. As this can have no effect after the poison has damaged the renal tissue, one would imagine that the only hope of getting good results with this would be to give large and repeated doses within the first few hours. It will be noticed that, in spite of an apparent amelioration of symptoms from the second to the fourth days, if urine secretion has not been established the prognosis is very grave. It would appear that the only hope of a successful outcome is the immediate treatment to prevent absorption of the drug. Once this has taken place, the outlook is bad.

The points of interest post mortem were the comparative freedom from lesions of the intestine, the very complete destruction of both kidneys, and the large lesion in the stomach, which had given rise to only trifling symptoms.

We are indebted to Captain C. R. Christian, R.A.M.C., for the blood-urea estimations, and have to thank Lieutenant-Colonel G. J. Houghton, D.S.O., R.A.M.C., for permission to publish this case.



Sport.

LOTUS AND BLACK BEAR: SOME ADVENTURES IN KASHMIR: AN ACCOUNT OF THE SLAYING OF THE RECORD BLACK BEAR.

BY MAJOR A. W. HOWLETT.
Royal Army Medical Corps.

(Continued from p. 58.)

Two days later I was encamped at a height of ten thousand feet at the head of a long boat-shaped valley which was hedged in on all sides by prodigious jungle of firs and pines. In the lower fields rice was growing in vivid green patches, and in others Indian corn, now tall and near to ripening. A small village lay hard by, with the *lambadâr* of which I made arrangements to draw milk and eggs and rice for myself and my servants.

Next evening I was out again with my shikari and we took our station among some rocks at the top of a steep declivity, down the sides of which there spread a thick growth of brushwood, leaving a clear ride open to our view. The ants were troublesome in the extreme, and we tried vainly to sit quiet. For the black bear has wonderfully acute powers of smell and hearing, though his eyesight is poor. It is the poor quality of his sight, so the natives assured me, that leads him to his savage unprovoked attacks on men whom he meets on the forest paths where he happens to be wandering, for he comes on them suddenly as on vague threatening shadows, and in sudden access of terror rushes in and strikes. And he is a truly terrible monster when he does strike, for rising erect with his huge ironclad paw upraised he towers far above the head of the tallest man, and the paw with its immense musculature of forearm can, with a single blow, smash in the skull of a cow. Howbeit, for two hours we sat there and continued to keep still enough, picking the ants off our clothes, and often from the back of our necks, until at last through the utter stillness which pervaded the heavily drooping jungle, we heard the well-known surging in the bushes and the rattle of snapping twigs. Once again our pulses were set beating, and there grew into view, for these great beasts do not appear and disappear, but merely come into being and fade away, a great glossy, coal-black patch, framed in a thicket of wild thorns. It was eighty yards away down the *khud*, and there it stuck immovable. Slowly I rose erect, my shikari grimacing at me the while, for we dare not speak, and having braced myself with my feet among the loose rocks, I drew a bead on the

black patch and pulled. The crash of the heavy rifle rang through the ravine like that of a gun, the recoil nearly knocking me off my feet. I was conscious of a vast silence, for though the jungle had seemed still enough, it had been in reality vocal with countless small noises, the hum of insects, cooing of doves, twittering of small birds. But as the report rang out every creature stood dead still.

"Load, sahib, load quick!" cried my shikari.

But I was already doing so, expecting every moment to see the fierce black face with its flashing rows of teeth dashing up towards me. For a full two minutes I stood at the ready, watching every bush in front of me, but the stillness held. Not a twig stirred. At last we made a move and began cautiously to descend. Amír Khan assured me that I had hit the beast, which was an old she-bear with a cub, and when we arrived where she had been we found it true enough, for the bushes were trampled wildly and both the leaves and the grass were covered with great gouts of blood. It was now dusk and Amír Khan said it was too late and too dangerous to follow up the beast that night. As it was clearly badly hit it would not go far and we should find it dead in the morning.

I cannot detail here the day-to-day chase of that animal, for though we started early next morning and followed all day we got never a sight of her. The blood marks were clear and later on gave place to splashes of serum and pus. More than once we came to soft patches in the soil where the beast had scooped out the damp, cool earth to apply to its wound. I was inclined to laugh when my shikari first told me this, but from what I saw later I had no reason to doubt the truth of it. He also asserted that wounded bears make themselves plasters of leaves which they stick into the wounds with their paws. This also I now believe to be true. At first, however, I was moved to mild sarcasm, and suggested that the animal showing so much medical sense had probably gone into Srinagar to the Mission Hospital to have its wound dressed. The track led us to the most infernal scrambles through brush and thorns and up the beds of water courses amongst heaped-up boulders. The third day we met a *gujar*, a wild excited fellow with long hair, who told us that only an hour ago he had been driving a buffalo over the hill above us when he was attacked by a wounded she-bear which the buffalo had driven off. We were off at once, and reaching a sort of grassy plateau high up, sure enough, we saw Mistress Bruin. But not before she saw us, and, while we were yet a hundred and fifty yards distant, she was off with a long lumbering canter into some dense scrub. She had been sitting by a solitary pond where the marks in the soft marginal mud showed that many wild creatures came to drink. Here, too, she had scraped out a great hole in the black moist earth, in which she appeared to have been sitting. She was very thin, and the great wound in her shoulder was plain. The *gujar* had described it also. And now the puzzle was how she could have received my heavy bullet in a spot where it should have been immediately fatal and should yet be running

about. It was not for four more days that we found the solution of the mystery, and a very strange one it was. At the time it disconcerted me, as it made me have doubts of my rifle and its stopping powers.

From our camp, morning and evening, before we went on with the search, which had become arduous and wearisome by this, we searched the skies above the surrounding crags and forest-clad peaks for signs of kites gathering. For wherever a thing dies in the jungle they learn quickly of its presence, and assemble above it, screaming and wheeling in the air before they descend. The crows, too, which fill even the jungle retreats with their impudence, often guide a hunter to a wounded beast, as with fiendish cruelty they chase it from bush to bush, from hiding place to hiding place, screaming and cawing the while, like a mob of Bolsheviks hounding down an aristocrat. One whole afternoon I followed a gang of crows which led me a fine dance with their wild cawing; but I could not come up with my quarry nevertheless.

Nearly a week had now passed, and as a last resort I determined to beat the jungle, when either I should at last find the poor brute and put an end to it or, perchance, should come across a fresh one.

One morning fifty villagers of all ages, from lads of fifteen to spindle-shanked old greybeards, gathered before my camp and were duly counted. Their various duties were assigned to them, some acting as beaters, some as "stops." The tracks of jungle and the ravines which we intended to beat were described to them in detail, and an hour or so after dawn we set out.

The first beat was over and had yielded nothing save a fox and jackal and a great number of bewildered owls, when two coolies came up with the exciting news that they had found the wounded bear. They had not seen it but knew where it was. It was vague, but highly elated I followed them as they led the way through thick growths of young firs. At last an awful odour smote my nostrils, which rapidly grew until it was sickening, and then all of a sudden I came on the scene of the last great jungle tragedy. In a bit of jungle on a steep slope lay a scattered collection of bones with bits of hide and black fur. The whole earth was teeming with black ants which were asprawl over ugly patches of dried blood. The bones, still moist and juicy, were also black with the insects. Beside me lay a skull pan, also damp, which was plainly that of a young, half-grown bear. All around were the broad footmarks, deep sunken in the soil, of at least a half dozen bears, and their foul droppings lay in heaps. The whole story was clear at a glance. I could not help thinking that our plight had been a perilous one indeed had we come unexpectedly on that shaggy crew at work on their cannibal feast.

Amir Khan said when a young bear was ill or wounded the old ones always slew and ate it. Here they had eaten the mother, too. And now the whole story was clear. When I fired Amir Khan had fancied the cub was standing alongside its mother. What had happened, then, was that

my bullet had gone through the cub, probably about the nape of its neck, and had then hit the mother in the shoulder. It is not often one shoots two bears with one bullet; my shikari said that in his experience it was unique. I expect he was right.

I was greatly cut up by the loss of the bear after my arduous search of a week, for, of course, the skins of both mother and cub were ruined, all that was left of either being a few shaggy tufts. Even the skulls were so broken as to be useless to bring away.

It was with some depression, then, that I resumed the beating, and we continued all day till the very last nullah which remained. Had I known what was to happen in that, I might have thought twice before I started, for we came within an ace of tragedy, just missing it by that small margin which nearly always seems to be just, and only just, interposed between the hunter and steep death. We sat down on the side of a watercourse, the dry, rocky bed of a stream which had an island-like ridge in the middle. The sides of the nullah were steep, and the jungle was very thick all round us. From where we had seated ourselves we had a view of open space over the watercourse and amongst the bushes across it. We heard the beat begin. The shrieks and yells of the beaters began to ring through the forest, whilst the clatter of their sticks on the tree trunks was like the rattling of machine guns. Some owls dashed out half blind and heavy winged; then a pretty little fox, whose quaint air of surprise made me gurgle with mirth as he stopped and turned his head in puzzlement in every direction, half curious and half annoyed,

At last, at last, wild shrieks of "Bhalu! Bhalu!" began to resound and the beaters went half mad with excitement. They were, indeed, yelling for their lives, for they had sighted a bear, and if the brute broke back, some of them would get a mauling. The thrill of that minute passes belief; all my nerves were tense as I watched the watercourse before me, thinking to see every second that shaggy, snarling form break forth.

My shikari was sitting close by me on my left with my shot-gun in reserve, holding it between his knees. Of a sudden I heard "bang! bang!" right in my ears, and a terrified "My God!" It was the only English I ever heard him speak, and he must have heard it from some other sahib in another tight place.

I jumped and looked, and was just in time to see the huge, erect form of the bear right beside us, with one paw in the air about to strike. It happened by great good fortune that there was the trunk of a small sapling about as thick as an arm which interposed between us. Had it not been for that, that great paw would have been on us like a lightning stroke; Amír Khan would have had his head smashed in like an eggshell, and the rifle would have been dashed from my hands leaving me defenceless. The two shots in the air turned the brute, and it broke back into the bushes. Instantly Amír Khan was on his feet crying: "It will kill three men! It will kill three men!" I sprang up with him and dashed back after the

bear, for the beaters were within a few yards of us and it seemed inevitable there would be a terrible accident.

For a minute, I suppose, I stood in a small open space no bigger than the floor of a room with the brush all round it, and I felt a sort of despair as I realized the trap I was in, for the brute would be on me with a single rush, and how could I stop him in the short space there would be between us? I cursed myself for having come out with a single barrel. Till then I had not realized the foolishness of it.

Then a yell from a coolie summoned me to my first place, and from there I just caught a glimpse of a big black back trying to slink past behind the ridge-like island I have mentioned. I ran and ran, then, he on one side of the watercourse, I on the other. At last I dropped into the bed of the stream where it was like a tunnel with over-arching bushes, and here he came up level with me, so that I saw a great patch of black shining fur through an opening about on a level with my head, and not three yards distant. I fired at it point blank, and it was off and away whilst I stood recovering from the heavy recoil. The coolies now came up hearing the shot, for I had ordered them to keep behind me. They were fairly wild with excitement, and why none of them were mauled is a mystery. Probably their yelling confused the brute and, savage as he was, scared him.

We followed the splashes of blood which were heavy, for, as I found afterwards, my bullet had gone clean through his loins, and soon I was so dead beat I had to lean against trees and then stagger on again. For some twenty minutes we kept it up and then, during a check, Amír Khan at last called to me, "Quick, sahib, quick!"

He dropped behind me and I went forward with my rifle, and, at last, I and my enemy were fairly face to face. Never shall I forget his glare and the fury of his savage, black, wrinkled face. He lay up a hillside some thirty yards above me among some young firs. I threw up the rifle and fired again, hitting him at the root of the neck. Even then he staggered up on his feet, glaring the while, and began to scramble down the hill towards me. I lost no time in throwing in another cartridge, and he had just begun to find his legs and gather speed towards me, when I fired again. It was a shot on which my life depended, but I managed to take it deliberately, aiming for his ear, and by good fortune that is where I got him. His great head dropped to the ground, and what with the momentum he had already gained and the steepness of the declivity, he turned a complete somersault and so came bouncing down over and over, rolled into a ball like a hedgehog. He would have knocked me over had I not leapt out of his way. As it was, he did not stop till he had gone something like sixty yards down the *khud*, and there he was brought up at last against a stout fir sapling.

By this the coolies were up with us and immediately gathered round the dead beast in spite of the angry shouts of warning of the shikari. He

picked up stones and clods and pelted it, but the huge creature that had been the terror of the jungle for so long was fairly defunct. When they were assured of this, the villagers' delight became delirious. They screamed and spat at the carcase, kicked it, and crowded round me, naming me a great *bahadur*, and even grabbing my hand to shake.

For myself, I may be pardoned if I say I felt something like emotion as the multiplied years slipped behind me and I was back again in the days of my boyhood, when I had dreamed of some moment like this. And for a space I could hardly believe that huge black ball of fur lying huddled and senseless before me had been my quarry, had sought my life as I had his, and now was dead. For a moment I felt, too, the dramatic force of this tragedy of the wild jungle, which was heightened by the fact that it was thundering, and the heavy reverberations were resounding from ravine to ravine like the ululation of a mighty organ pouring out a lament for the dead.

We carried the beast back to camp, and there I photographed it, and we skinned it. The huge carcase with the skin off looked appallingly like that of a gigantic man, a wondrous study of anatomy.

Monkeys were very numerous all round our camp, and two days later, which chanced to be my birthday, the villagers brought me a present of a young one. It was a savage little devil at first. I kept it tied by a long cord to an apple tree just outside my tent. Eventually I took it back into India. It had enough adventures on the way to make a monkey Odyssey, if it had ever got back to its kind and told them the story. Its favourite food was apples, and it ate so many of these that its little stomach grew swollen and tight as a drum. It would then fold its arms behind its head and lie back with a comical air of repletion and content. On this account I named it the Nawáb Sahib, a name which tickled my servants hugely. Another present they brought me was a large chunk of honey of three or four pounds weight. It is a great delicacy in Kashmir, where people invite the bees to build in the walls of their houses by making little borings in the outer walls. The hive is then fixed within and the honey is withdrawn from the interior of the house.

It may seem that I have disparaged the Kashmiris in some ways, and of a truth I could not help comparing them at times with the more sturdy, independent races of the Punjab. They live in a land potentially one of the richest imaginable, yet they are miserably poor and slavish. It was odd to hear them lamenting and longing with all their hearts to be made a portion of British India, whilst in the Punjab, which I had lately left, the ignorant populace, led by the malcontents, now so well-to-do that they had forgotten altogether who was responsible for their prosperity, were gassing about independence and the restoration of native rule.

But I have a word to say for my shikari, Amír Khan, who was a truly brave man, hardy and reliable. I made him a present of a hunting knife, which greatly delighted him. I did not realize until he came with me

what a gamble the life of a big game shikari must be, how much his life lies in the keeping of the sahib who engages him. I know he questioned my bearer closely about me, and my bearer, of course, told him I was a good shot; and when I hit the first bear down the khud and obeyed his injunctions by reloading at once without looking round, his relief was palpable. Often I had noticed him closely scrutinizing my face, as if to read it, with quick, half-anxious glances. His duty is to sit by whilst the sahib shoots; he has no weapon himself unless he carries spare rifle or gun, and even that he is not supposed to fire unless his master is knocked down and being actually mauled. If he goes with a jumpy or very excitable individual, or one who fiddles about with his weapon or treats the whole business as a joke, the poor man is, of course, in a very evil case, for he knows all too well the grim possibilities that underlie fooling about with big game hunting. Probably it is in these cases that he cannot find the game and has to go away with a bad "chit," which is, however, better than not going away at all, or with half his face torn off. Amir Khan was a bit of a naturalist, too, and full of forest lore. We became tacit friends who understood one another perfectly and, later on, when I was suddenly taken ill, his grief that our hunting together must cease was sore, and he never ceased to talk of the time when I should be restored and rejoin him in another trek.

Echoes of the Past

"A VOYAGE TO CHINA OVERLAND."

INTRODUCTION BY FLEET SURGEON W. E. HOME, R.N.

THE writer, Dr. W. Home, Staff Surgeon, 2nd Class, was the youngest son of Dr. James Home, Professor of Practice of Physic in Edinburgh. He graduated in 1837, and after a period of study in Paris, joined the Medical Department of the Army. He was sent to Canada and lived at Kingston, Ont., with the P.M.O., Dr. John Smith, who afterwards was head of the Department in the Crimean War. At Kingston (as later at Hong Kong and Mauritius) he established a dispensary for the treatment of poor civilians, because he recognized there were at that time few well trained doctors abroad except in the Army. On his return from Canada he was appointed Assistant Surgeon to the 26th Cameronians, then at Edinburgh. He left the regiment a year and a half later, on his promotion to Staff Surgeon, 2nd Class, amid expressions of regret, twenty officers of the regiment uniting to give him as a memento a family Bible with a suitable inscription. Shortly after he was sent to Hong Kong, whence he was

transferred in a year to Mauritius, where he did a successful practice until, in 1855, he was sent to the Crimea, where, being promoted, he was medical officer of a division, and seems to have satisfied Sir John Hall, the P.M.O., for, in his "Life," at p. 416, he says, "Home is an intelligent first-class man also. I put him at the head of the Pathological Board in camp." He afterwards served in Ireland, China, and Scotland, and retired from ill health, in 1870, as a Deputy Inspector of Hospitals. He died in 1876.

A VOYAGE TO CHINA "OVERLAND" IN 1848-49: EXCERPTS
FROM THE HOME LETTERS OF A PASSENGER, AN ARMY
SURGEON FOR HONG KONG.

INTRODUCTION.

The Steamer "*Ripon*," off Cape St. Vincent, *Christmas Day*, 1848.

I WRITE in the Cabin all hung round with holly. We have had the usual service of the Church of England, performed by a German missionary (Ehrhardt, C.M.S.), for Aden and the East Coast of Africa. On Wednesday, 20th, in London, my careful servant had me up at $\frac{1}{2}$ past 5, my fire lighted and my breakfast laid, and after cramming all I had left into a carpet bag I was on my way to the Railway by $\frac{1}{2}$ past 6. The train was tolerably full. A great proportion of our passengers, 3 or 4 in my carriage, were bound on this lengthened journey. Reaching Southampton at $\frac{1}{2}$ past 10, and accompanied by the Adjutant and my carpet bag, went on board a small tug steamer, was conveyed a couple of miles out into the Southampton river, and there introduced to the "*Ripon*," large, newly painted, apparently ample in its accommodation. It is a paddle steamer. My berth, 91, is a dark and forbidding spot. Then went ashore to farewell friends, and returned, arriving in time to accompany the Indian Mail on board, 150 boxes all of the same size and shape, nailed and sealed, painted according to destinations, blue, Calcutta, yellow, Madras, black, Ceylon, white, Bombay, and red, Hong Kong. The pile was immense, and gave a gigantic idea of the magnitude of our communication with our Eastern Empire. Sailed and found there were 4 beds in my cabin. At 4 o'clock the hour of dinner had arrived; a full hundred sat down, and all hungry. Tea made its appearance at 7, and after tea an unexpected band of 6 performers, who played not amiss. Our pilot left us as we passed the Needles at 9. At 10 I went to my bed, the cabin decidedly improved by a suspended lamp.

Gibraltar, *Tuesday*, Dec. 26th.

Weather now delightful. In quarantine as there is cholera in England. Arrived at 4 p.m. (6 days out). Coaling all night. Letters are received with tongs and are fumigated. Sailed at 11 a.m. Most of us at night play whist, also there are chess, écarté, backgammon and draughts. After tea at 7, there is wine and biscuits at 9. Lights out at 10 $\frac{1}{2}$, in the cabins at 11.

Off Alexandria, *January 4th*, 1849.

Anchored at Malta 31st (11 days out), at 9 a.m. Oranges, especially Mandarin, much appreciated. Picked up here passengers who had come through France.

We left on the afternoon of the 1st, and we have on several days done 250 miles. We are making up our parties of six for the vans in which we are to cross the desert, and drawing lots for the period of our several departures. With good luck the set to which I belong have drawn 19 (out of 20) in the order of departure, so I hope there will be time for us to see the Pyramids, 3 hours ride from Cairo. The majority of the party will spend their leisure hours at Suez, 118 1st cabin passengers, 18 2nd, 9 children and 30 or 40 of crew.

"Bentinck," in the Red Sea, *January 13th*, 1849.

Writing difficult, ship vibrating much, engines so strong, 550 h.p. Reached Alexandria at 11 a.m. on 5th (15 days out). 4 of us got into a boat and were conveyed by a single rower to the shore. The number for each boat is painted on it, as is also the exact amount of the fare, a shilling, Mehemet Ali having with the most scrupulous minuteness made the most precise arrangements in everything that relates to the Overland Route. Camels were patiently waiting for the baggage, and one or two omnibusses here also to take us and our bags to the hotel. Also there were donkeys. With an Indian medical officer (Son of Sir Geo. Ballingall) from Edinburgh, called on Dr. Farquhar, an old Edinburgh friend, in good practice; and saw Pompey's Pillar, Cleopatra's Needle, and the slave market, the majority apparently happy and contented with their lot. Not one white face from Georgia. Value (of blacks) varied from £15-£30. Dined with Dr. and Mrs. Farquhar (soup, fish and roast goose) and Dr. Farquhar mounted us and took us to the docks and palace for a ride, and back to tea at 6, and after an hour and a half rest and chat it was time to return to the hotel where we found all in preparation for departure. The passengers were in numbered parties of six for the drive across the desert. For the journey to Cairo there were two groups, of which one left Alexandria at 1 p.m., the other at 8 p.m., the parties, in pairs, were to leave Cairo at intervals of four hours. The second group, we left the hotel in omnibusses, drove five or six miles to the commencement of the Mahmoudieh Canal. Our boat was pretty well packed, and towed by steamers, contrived to accomplish the journey to Afteh on the Nile by daybreak on the following (Saturday, 6th), morning. The night was exceedingly sharp and cold, so that all were forced to pack into the small cabin. My share being a portion of the floor under one of the tables. In Egypt I never saw, by night or day, a single cloud. We had a brilliant full moon by night. The Nile steamer we joined at Afteh was small but very comfortable, the property of the Pasha. With a strong current and head wind our speed did not exceed 5 miles an hour, so that starting from Afteh at six a.m., we did not reach Boulac, the stopping place for Cairo,

before 1 or 2 next morning. I shall not forget my sail on the Nile. It reminded me of the Mississippi. The villages were miserable, some of them prettily situated among groves of palm trees. No crocodiles. We passed 3 steamers full of passengers from India, and gave them a hearty cheer. The port of Boulac is two miles from the town. The moon was shining as bright as day, so we decided, if it was at all possible, to see the Pyramids, 15 miles from Cairo. We took care to land the very first, drove in a sort of fly from the river to the town, and after securing the services of a guide, at the Transit Office found we were fixed for 5 in the afternoon. Some of the first set had already started. Resolved to miss sleep, rode on donkeys to the Pyramids, and went inside, but not to the top, and were back in Cairo at 11. A Turkish bath and food, Mosque Sultan Hassan, the Citadel, Mehemet Ali's Palace and the Mosque, the Bazaars, and dinner at 4. The excellent guide got £1, the donkeys, which were thought to have done 40 miles, generally at a canter, cost 4/- each, and total cost per head 20/- well spent. Very soon after 5 a six inside covered spring van with four horses and a Turkish driver appeared at the Hotel door, and in it we were to make the passage of the desert. Two others started at the same time and carried the last of our party to Suez. We took abundance of oranges to clear our throats of the desert dust. Off we set, a long Egyptian lad of eighteen running in front, cracking a whip to clear the way. Not half a mile from the hotel we found the town end and the desert begin, more like Portobello sands than anything else I have seen, 75 miles between Cairo and Suez. At first it was dead flat, but within a stage or two of the Red Sea it became hilly and rocky, the rocks exactly the colour of the surrounding waste. I often thought of the utter hopelessness of people like the Children of Israel, shut in on all sides by the barren desert. Our road was a track marked by small piles or heaps of stones, gathered for the purpose of directing the travellers. Small telegraph towers were also every here and there, built by the Pasha to facilitate the Overland Route. Our stopping places were every 5 to 7 miles for changing horses, our cattle being completely done up by the heavy draft through the deep sand. We had plenty of room, and, when not asleep, chatted all pleasantly together, or joined in the chorus of some well known song. The time passed rapidly away, and so did the dark, and at the Central Station we made an early breakfast on food as in England. At 2 in the afternoon (7th) we arrived at Suez. The only travellers we had met on the desert, were the various parties of camels transporting our baggage, the most picturesque being those transporting the mail in its many-coloured boxes, with its guard mounted. Went off with the missionary, Ehrhardt, to visit the "Camel ford," the nearest suggested point for the Israelites' crossing of the Red Sea. Were the last passengers to embark in a boat for the "Bentinck," lying four miles off. The dinner at the hotel, kept by a Scotsman, was exorbitantly priced at 5/. Were three hours getting off, and the ship sailed at 1 a.m.

I have a better cabin on "Bentinck." In the dining saloon we are kept cool by windsails and open windows, by cooled wine and iced water, but this is winter and the temperature above 82° ; what in the world will summer be! Immense cockroaches, $1\frac{1}{2}$ to 2 inches long infest our cabins. On the 14th (noon) passed the Straits of Bab-el-Mandel arriving at Aden at 8 p.m. (twenty-five days from Southampton). The passengers (22 left the ship here for Bombay, including Ballingall), visited Aden in the forenoon, and I got on board just in time to have a shower bath and to prepare for dinner. Arabs on camels bring in firewood, sheep (4/- or 5 -), and ostrich eggs, taking back cotton, dates and water in skins. Rupee exchange 10 to the sovereign. I was astonished to see what good masonry the brown fellows (Indians) turned out. We found the band of one of the Sepoy Regiments practising, and really the piece we stopped to hear was executed in a manner that would have been creditable to Europeans. The Sepoy soldiers a very fine set of fellows, taller considerably than our own men. Though we have the N.E. Monsoon against us, it is not strong. Sometimes a calm, and the sea phosphorescent at night, all over one evening, almost like a smooth sheet of Canadian ice reflecting the light of a brilliant moon. The crew more numerous than on "Ripon," lascars and seedies. The captain, I hear, gets £1,000 a year, the doctor's post is worth £400, the steward's, £200. From our own pay $3/6$ a day is stopped for messing, this includes drinks. Total expenses to China expected to be £5. Breakfast ends at 9, everyone on deck till 10 at night, except for meals. Ice has given out, only water now, which is tepid, and brought from the Ganges, which, like that of the Thames, keeps better than any other at sea. Steward's fees were made a separate charge and paid before starting in London, £4 for the whole journey, but the young ones on board give an extra sovereign when they leave. In this cool weather passage (83°) no one seemed to sleep on deck. We made about 240 miles a day. Reached the harbour of Galle at 7 a.m. on the 27th (37 days from London), the "Malta," a new ship, waiting for us, to make her first trip to China. She left England in August last, sailed round the Cape to Bombay, there had her paddles put in their places. At Ceylon all the Company's steamers rendezvous at Point de Galle, each leaving China, Calcutta, and Bombay so as to meet at Point de Galle at the same time. I took my baggage on board the "Malta," and went ashore to breakfast. Spent the day with an Army doctor, 14 years in Ceylon, and sorry to be now ordered home. A charming spot. Sailed at 5, having got $21\frac{1}{4}$ rupees for a sovereign, with few passengers and great comfort, in this ship of 1200 tons and 480 h.p., extra strong to stand the typhoons. Favourably impressed with the Chinese in the crew, clean, smart, and intelligent, though not beauties. The nights are hot, partly the vessel being of iron. She is new and tolerably free of cockroaches, but I found a rat in my basin. Another inconvenience is the strong smell of opium that pervades the ship. Thermometer nothing above 88° , but 120° in the engine room! 30

tons of coal an hour is our ship's allowance. At 6 we get a cup of coffee, at 7 a tub of sea-water is brought, at 8.30 we have breakfast, tea, toast, fried fish and potatoes; at 12, lunch or tiffin, soup for me, for the others, cheese, anchovies and beer; after lunch I play chess. At 4, dinner, mine to-day was soup, the wing of a duck, potatoes, rice and curry sauce, plum tart, claret and water, and dessert, pineapples, the best anywhere, at Penang yesterday, a farthing each, mangosteens, the small white inside has the delicate flavour of a rich plum, watermelon, an old American friend of mine, and last the Plantain, a long narrow yellow soft fruit, more like a mealy apple than anything else. Penang I saw only in the moonlight.

Singapore, *Feb. 6, 1849.*

We arrived (three days after leaving Penang) on the forenoon of Tuesday the 6th (47 days from London), and must wait to take on board 400 tons of coal. As we were not to leave till early on Thursday (7th), we had ample time to see the town and neighbourhood. The smoke and soot on board a steamboat is a serious inconvenience in that otherwise excellent mode of travelling. The accumulation of dirty linen becomes great and tiresome. Coals are all sent to the coaling stations from England, the P. & O. company employing in this about 200 sailing vessels. Here they cost £2 or £3 a ton, at Aden £3 10s., at Suez £4 10s., being there all transported from Alexandria, across the desert, on the backs of camels.

The first interest at Singapore was the number of Chinese with pigtailed umbrellas. Malays rather resemble them and so are easily distinguished from the Indians with rather a European cast of countenance. We lay two miles from the shore. Houses are good, displaying neatness and taste. With an Indian merchant, a fellow-passenger, took a carriage for the day (4/-), the driver ran by the horse, saw multitudes of curios, especially in the great shop of Whampoa, a Chinaman. We drove to Johore, and called on the Maharajah, pleased to see us. Pineapples very good, also oranges, which are green outside. Dinner at the French Hotel, good and 5/-. After dinner the bells of the church announced the mid-week service of the Church of England, which we attended, thrilled to hear the well-remembered words so far from home, with cane seats instead of pews, and sitting under noiseless, perpetually moving punkahs. The ship sailed 7th at 6 a.m., weather gradually became cool and pleasant, appetites improved, and Hong Kong appeared on the 16th (58 days from London), through a haze and rain that might have been in the Channel. Islands with elevated and rounded, not peaked, tops, the characteristic of granite. Herbage scanty, brown, more on the low grounds, almost wanting on the bare red summits. The town of Victoria stands on the shore of the bay, and on the side of the hills which rise rather rapidly behind it, facing north. The place altogether was larger and more imposing than I had expected. The town proper might extend East and West about a mile, while for a mile further were detached warehouses and places

of residence. Nowhere was a tree to be seen beyond a bushy size, and these but rarely. The hills something like Arthur's Seat, but twice the height. We landed in one of the Chinese boats, occupied by a family, the mother steered. Coolies slung our trunks to their stout Bamboos, and off we set to a place called "The Club." There I left my things, and called on the Head of my Department. My arrival was quite unexpected, the ship 5 days early too. Dr. Ferguson, Deputy Inspector of Hospitals, two steps of rank above me, lost his wife two months ago. After sitting with him chatting a couple of hours, he proposed that I should have a room in his house, till I determined on my future plans. Here I have been ever since. I dine to-night with the Commander of the Forces, General Staveley; temperature 75°. I have made acquaintance with the Episcopalian clergyman, and took a walk of several miles with him the other day. Heavy baggage expected, round the Cape, in a couple of months.

Current Literature.

- i. TÔYAMA, I. **Studies on Lacquer Dermatitis. III. Dermatitis produced by Chinese Lacquer.** *Japan. J. Dermat. & Urol.* 1926. v. 26, English summary, pp. 51-5. [In Japanese pp. 927-36, 3 figs. 43 refs.]
- ii. ——— & USUBA, T. **Studies on Lacquer Dermatitis. IV. The Histopathology of Lacquer Dermatitis.** *Ibid.* English summary pp. 56-7. [In Japanese pp. 937-46, 3 figs. 18 refs.]

i. There is a strong reason to suppose that the lacquer tree is not indigenous to Japan. It is probably an imported specimen of the *Rhus vernicifera* D.C. of China. It grows wild in the latter but not in the former country. According to the author, records of its artistic employment in China date from 2640 B.C.; in Japan from 392-291 B.C. To-day much the larger proportion of the local consumption of lacquer in Japan is a Chinese product. For this reason it may be stated that the chief cause of dermatitis from handling the boxes of "mah jough" sets is due to Chinese lacquer.

The poisonous principle is "urushiol." Raw Chinese lacquer contains approximately between 70.02 per cent and 36.88 per cent. In the Japanese variety it is somewhat larger. Experimentally, a drop, the size of a pinpoint, diluted ten times in olive oil, applied to the skin, brings out in seven hours erythema and œdema. With the Chinese product, this does not appear until the following day. Moreover, the inflammatory condition always remains less severe. With either substance, papules and vesicles usually form. The fresh lacquer is always the more virulent. Thorough dryness and oxidation remove the danger of dermatitis. Industrial lacquer dermatitis is of great antiquity in China, although the

rashes it produces were often mistaken for other skin diseases. Treatment of this complaint seems to have been first described between the years A.D. 281 and 361.

Tōyama next proceeds to discuss the differences between this dermatosis and those of *Rhus toxicodendron*, *venenata* and *diversiloba*. In the latter cases he says: The heart's action and arterial tension are increased, dyspnoea and even congestion of the lungs may be present, together with other general symptoms. No cases of serious complications are known to have followed external poisoning by either Chinese or Japanese lacquer. On the other hand, three fatalities after external exposure to *Rhus*, in North America, are known.

For the bibliography we are referred to the complete paper written in Japanese.

ii. After the application of crude Japan lacquer (Ki-urushi), or its active principle (urushiol), to three susceptible persons, several pieces of skin were removed and examined.

The first statement of this extract is perhaps a little difficult to reconcile. "In the earliest stage, namely, two hours after the application of the lacquer, there was along with the destruction of the sebaceous glands a serous exudation, or formation of vesicles, immediately beneath the horny layer, without any remarkable histologic change in the lower epidermal layer or in the corium." A few hours later this is replaced by a marked oedema. This spreads widely, involving the deep epidermal papillary and sub-papillary tissues. The vessels dilate and become surrounded by emigrant cells. At this time the skin appears red, but there is no itching. Everywhere the prickle cells get separated, the intervals become filled with leucocytes and thus the vesicles are formed. The horn cells become ill-formed and eosinophiles appear in large numbers in the epidermis, corium and vesicles.

The poison of Japan lacquer is very soluble in fat, but does not destroy the cells. In one case only, after the application of a strong extract, continuously for 24 hours, was necrosis of the prickle cells observed. The inflammatory symptoms begin to subside in about five days' time.

Three figures are given in the original article.

R. PROSSER WHITE.

Reprinted from "Bulletin of Hygiene," Vol. 2, No. 11.

BADHAM, C. & TAYLOR, H. B. **Lead Poisoning. Concerning the Standards which should be used in diagnosing this Industrial Disease, together with a New Method for the Determination of Lead in Urine. Studies in Industrial Hygiene, No. 7. Rep. of Director-General of Pub. Health, New South Wales, for 1925.** Pp. 52-78. [23 refs.]

Consideration is given to the standards which should be used in diagnosing industrial lead poisoning. First, a new method is described

for determining lead in urine; calcium oxalate is used for adsorbing the lead present, the amount of which is finally determined by the sulphite reaction described by IVANOV; an accuracy of 0.005 mgm. of lead per litre of urine is claimed. The toxicity of lead compounds is then discussed and the effects they exert on human tissues of which basophilic degeneration of young red blood cells associated with anæmia is placed first, followed by a series of other degenerative lesions. Analyses are given in support of the Harvard work on the storage of lead as an insoluble phosphate in the skeleton. The symptoms and signs of lead poisoning are dealt with in detail; the suggestion is made that punctate basophilia of the red cells bears a definite relation to the amount of lead in the blood stream. In mild or early chronic poisoning, from 0.1 to 0.2 mgm. of lead per litre of urine may be expected; but traces of lead may be found in both urine and fæces of persons having no known exposure to lead; a series of analyses bearing on these points is given in three appendices.

Proposed standards are put forward for both: (a) mild, and (b) severe forms of lead poisoning. The article closes with a summary of various investigations concerning plumbism in Australia, in which the Technical Commission of Inquiry at Broken Hill comes in for some sharp criticism, and apparently not undeservedly. [Since publication of the researches of the Harvard workers, this study is the most important contribution to the subject of lead poisoning.]

E. L. COLLIS.

Reprinted from "Bulletin of Hygiene," Vol. 2, No. 11.

SCHMIDT, P. Der gegenwärtige Stand der experimentellen und klinischen Forschung ueber die Ursachen der Bleiwirkung. [**Current Views on Causation of Lead Poisoning.**] *Zent. f. Gewerbehyg. u. Unfallverhütung.* 1927. v. 14, 180-82. [12 refs.]

The author—a high authority—discusses the present position of experimental and clinical knowledge on the causation of lead poisoning. He enters into the difficulties in diagnosis, the unsatisfactory nature of the four leading characteristics—the blue line, the facies, punctate basophilia, and the presence of hæmatophyrin in the urine. He accepts the view of lead absorption as distinct from lead poisoning, and speaks of "quite healthy lead carriers." He is seeking a method of demonstrating lead poisoning and not lead absorption, which is all that the various tests do now, unless wrist drop is present, or terminal symptoms following granular kidneys. What he is aiming at he calls "micro-analysis" of the lead in the excreta and organs. He only outlines the method, reserving a full description for publication in the *Deut. med. Woch.* [see this *Bulletin*, v. 2, 321]. It is colorimetric, demonstrated after conversion of the lead into PbO_2 , and then, by aid of the Arnold-Menzel-Trillat reagent, production of a blue colour (from reduction of the peroxide) due to the presence of lead.

Qualitative control is made by means of Loine's spectrograph enabling determination of lead qualitatively to be made in amounts so small as thousandths of a mgm.

[The article is suggestive and well thought out.]

T. M. LEGGE.

Reprinted from "Bulletin of Hygiene," Vol. 2, No. 11.

SAYERS, R. R., FIELDNER, A. C., YANT, W. P., & THOMAS, B. G. H.
Experimental Studies of the Effect of Ethyl Gasoline and its Combustion Products. *U.S. Bureau of Mines.* 1927. 447 pp., 55 ill. Appendix with 8 ill.

Motor spirit, which is coming, in the interests of economy, to contain the less volatile distillates, has a tendency to "knock" or "detonate" in the motor; and the greater the compression, the greater the knock. Knock can be suppressed by adding to the spirit small quantities of such chemicals as aniline, ethyl iodide, tetraethyl lead, ethylene dibromide, or organic selenium and tellurium. Of these tetraethyl lead (C_2H_5)₄ Pb, is the only marketable and valuable anti-knock; it is effective when present to the extent of 1 part in 1,270 motor spirit, or 0.08 per cent. Its use, when combined with engines redesigned for high compression, may give 50 per cent. greater efficiency and twice the present mileage per gallon. But the use of the compound commercially in the United States raised the question as to whether thereby a serious risk from lead poisoning was not being introduced. The question has been very thoroughly investigated in America and now a volume has been published in which are set out in detail extended studies made by exposing animals to vapour of motor spirit, before and after explosion, containing varying amounts of tetraethyl lead. [See also this *Bulletin*, v. 1, 406, 641, 642.] Monkeys, dogs, rabbits, guineapigs and pigeons were used. Exposures were continued for six months, for three hours and for six hours daily, to exhaust gases from commercial ethyl gasoline, i.e., spirit containing 1 part tetraethyl lead in 1270.

No symptoms characteristic of lead followed; the animals put on weight, were healthy, lively and had good appetite. With exhaust gases from motor spirit containing 5 times the commercial concentration of tetraethyl lead, exposures were continued for 13 months. Except for some loss of weight, no symptoms characteristic of lead were obtained; the animals were apparently healthy, lively and had good appetites. But the concentration, which was $2\frac{1}{2}$ times what theoretically could be produced by using commercial ethyl gasoline, appeared to be near the threshold for toxicity. The value of the threshold so determined is in fair agreement with the calculation of LEGGE that 2 mgm. per day is the lowest daily dose which may in time set up poisoning. Tests on men breathing exhaust gases showed that on the average 87 per cent. of the inhaled lead dust was again exhaled. When the animals were exposed to vapours of the ethyl spirit, symptoms

of poisoning were produced varying in intensity with the proportion of tetraethyl lead present, from depression and malaise to mild or marked nervousness, excitability, tremor, and even partial paralysis and early death. Determinations of vapour of motor spirit in the air around filling stations showed a prevailing concentration of 0.01 to 0.03 per cent. ; and one of as much as 0.01 per cent. as rare and momentary. Vapour of motor spirit, apart from any lead content, causes in men mild symptoms of dullness, unsteadiness and giddiness after 50 minutes exposures to 0.1 per cent. ; moderate dizziness after 30 minutes exposure to 0.3 per cent. ; and coughing, numbness in legs and unsteadiness after 10 minutes exposure to 0.7 per cent. Commercial ethyl spirit (1 : 1,270) applied to skin was no more injurious than straight spirit ; but at 10 times that strength (1 : 127) it caused death of rats and guineapigs through skin absorption of lead. The whole volume is freely illustrated and tabulated. The conclusion of the matter appears to be that tetraethyl lead is a valuable material for benefiting motor traffic, which can be used commercially with safety to the public.

E. L. COLLIS.

Reprinted from " Bulletin of Hygiene," Vol. 2, No. 11.

HALDANE, J. S., & LLEWELLYN, T. L. **Miners' Nystagmus.** *Brit. M. J.* 1927. Apr. 30, 809-10.

The object of this address is to answer those who have called in question that defective lighting is the essential cause of miner's nystagmus. The authors were members of the Committee of the Medical Research Council which came to this conclusion. The evidence in support of the influence exerted by defective illumination is restated, bringing out how closely the incidence of the disease is correlated with the dimness of illumination provided underground. Where naked candle lights are used, the disease is nearly unknown. Ordinary safety lamps give less light than naked candles : hence, the disease is found where safety lamps are used. Such lamps provide an illumination which strains the power of sufficient adaptation possessed by the eye. The disease is in fact an occupational neurosis affecting the external muscles of the eye. It also possesses definite neurasthenic symptoms, as do other forms of occupational neurosis. The suggestion that the disease depends in any way on gases emanating from coal as it is found in the mine, or that it can be in any way an infectious disease, theories which have been propounded, are refuted ; as also is certain false evidence brought forward against the advantages accruing from better illumination. Some description is given of advances which are being made in obtaining greater light from lamps, especially from electric lamps. In particular, the use of electric lamps worn in the miners' caps, as is the practice in America (and as naked candle lights are worn), is strongly advocated. In the United States, where electric cap-lamps are the only form of

safety lamp used, miners' nystagmus is an unknown disease. The authors consider that the causation of the disease is now fully understood and that it only remains, for its extermination, to adopt a higher standard of illumination in our coal mines.

E. L. COLLIS.

Reprinted from "Bulletin of Hygiene," Vol. 2, No. 11.

WU LIEN TEH. **Quarantine Problems in the Far East.** *North Manchurian Plague Prevention Service. Reports 1925-1926.* Vol. 5. Pp. 272-6.

There is need of uniform quarantine procedure: the laws affecting international health are unduly severe in some advanced countries and absent in others; in international as in communal hygiene each unit (country) should render its best.

China is handicapped by a 4,000 years old civilization; her modern public health officials have a hard fight and need encouragement from neighbouring more complete organizations.

Typhus only exists in a mild form and in the Northern provinces; cholera is often absent, smallpox universally endemic, yellow fever not known, and bubonic plague confined to the two coastal provinces, Fukien and Kuang-tung.

Propaganda and free vaccination are considerably reducing smallpox: Rogers's hypertonic saline treatment saves 85 per cent. of the most severe cases of cholera: the origin of pneumonic plague has been definitely traced to the Siberian marmot and a permanent agreement between the Soviet and Chinese services is hoped for: control of bubonic plague still awaits proper co-operation.

If migrants are vaccinated against smallpox on departure, bubonic plague remains as the only disease of international importance.

Hitherto the Chinese Maritime Customs have appointed busy foreign local medical practitioners who only examine ships when epidemics threaten or invade a locality. By Treaty, permission of the local consular body must be obtained before enforcing regulations against any foreign vessel. Reference to Plenipotentiary in Peking or the whole Diplomatic Body causes suicidal delay, and want of uniformity in quarantine laws serious misunderstanding.

Possible interference with commerce leads to absence of information of outbreaks as between port and port. There should be a mutual interchange of notes between responsible health officers.

At Canton, Swatow, Amoy, Hankow and Chefoo should be hospitals and full-time medical officers. Newchwang model may be followed. In presence of so many nationalities each with its complex laws the Chinese Government is undeservedly blamed for not meeting eventualities.

The author proposes a commission, in which the Chinese Government,

the United Foreign Chambers of Commerce and the International Health Board of the Rockefeller Foundation be represented, to visit the ports mentioned and arrange a comprehensive scheme, their report to be submitted to the Central Government, the Diplomatic Corps and the Health Committee of the League of Nations for approval and action. The decision by the Council of the League of Nations to create a Far Eastern Central Epidemiological Intelligence Bureau at Singapore embodies all far Eastern countries. The functions of the Bureau are to receive, exchange and circulate information regarding infectious disease and epidemics in countries, ports and ships.

An interesting suggestion in Dr. WHITE's report to the Council of the League divides ports into 1st, 2nd and 3rd class. For a 1st-class port: (1) Adequate Health Staff; (2) Apparatus for fumigating large vessels at anchor; (3) Trained staff for capture and scrutiny of rats; (4) Quarantine station for deck passengers; (5) Laboratory; (6) Infectious Diseases Hospital; (7) Safe and adequate water supply; (8) Machinery for dealing with dangerous communicable diseases.

2nd-class—without (2) and (4). 3rd-class—any port not 1st or 2nd-class.
W. M. WILLOUGHBY.

Reprinted from "Bulletin of Hygiene," Vol. 2, No. 11.

Reviews.

THERAPEUTIC MALARIA. By G. de M. Rudolph, M.R.C.S., L.R.C.P., D.P.H., D.P.M., Assistant Medical Officer, Claybury Mental Hospital, London County Mental Hospitals Service. Humphrey Milford, Oxford University Press. Pp. 223. 55 figures, 31 tables, 2 coloured plates. Price 12s. 6d.

The subject matter in this volume is divided into two parts. In the first is an account of the history of, indications for, results, and mode of action of artificially induced malaria in the treatment of general paralysis. It is found that in about thirty-three per cent of the cases thus treated good and lasting remissions occur, while in a smaller percentage good partial remissions ensue. The author admits that it is difficult to gauge exactly the value of any treatment in this disease, because of the marked natural remissions. He nevertheless regards it as beyond doubt that in many cases lasting benefit does result.

The second part of the book is devoted to the study of malaria. In ordinary practice, whenever we diagnose malaria it is so much a matter of routine to exhibit quinine at once that few of us have ever seen the disease other than in cases quickly brought under the influence of this drug. In therapeutic malaria, however, not only is the induction under complete

control, but a series of natural relapses are allowed to occur before treatment is instituted. The author, who at Claybury Mental Hospital has infected a series of about seventy cases of G.P.I. with benign tertian malaria, has had therefore an opportunity of observing facts which never come to the notice of those who are concerned chiefly with the cure of naturally acquired malaria.

Here are a few of the more interesting points to which he draws attention.

Inoculation can be effected either by means of infected mosquitoes (a method which is not recommended for routine use because of the difficulties involved in keeping a supply of suitably infected mosquitoes), or by injecting by the subcutaneous, intradermal, intramuscular, or intravenous routes, blood containing parasites taken from an active case of malaria.

The subcutaneous method is the most convenient, and generally the most suitable. The blood when withdrawn from the donor should be defibrinated or citrated, and then well "washed" with Ringer's solution. In this condition it will generally remain infective for twenty-four hours without any special precautions being taken. If frozen, it will retain infectivity for longer periods, but it is usually advisable to make the inoculation as soon as possible.

The incubation period is from seven to twenty-five days in mosquito infected cases, one to thirty-two days in subcutaneously injected cases, and one to nineteen in intravenously inoculated cases. The relationship of the incubation period to the number of parasites injected is inconstant, but generally speaking when larger numbers have been injected they can be detected earlier in the blood of the patient, although the incubation period, when measured by the first appearance of fever, is not notably shortened.

The existence of individual immunity is definitely established, as certain persons were repeatedly inoculated with known active strains without developing malaria. Furthermore, one attack is found to confer a considerable degree of artificial immunity. Reinoculation, it is true, is followed in the majority of cases by reinfection, but in most cases the rigors are few and mild, and spontaneous cure ensues. A similar spontaneous cessation of rigors has been observed in some primary cases. Observations on parallel cases show that this is not due to any attenuation on the part of the parasite, but to some form of resistance on the part of the patient.

In the majority of cases an irregular initial fever occurs prior to the onset of a temperature of the classical tertian type. A similar phenomenon is to be observed as we know in naturally acquired malaria, but here there is always the possibility that infection has resulted, not from a single bite from one infected mosquito, but from a series of bites at intervals of a few hours. In therapeutic malaria such a possibility can be definitely excluded. Assuming that the classical febrile paroxysm corresponds to sporulation of the parasites and the coincident liberation of toxin, how is this initial fever to be explained? The author advances, and is inclined to agree with, the

theory put forward by Korteweg, who suggests that the body reacts differently to malarial toxin on the first occasion than on subsequent occasions, and that at first a little of the toxin gives rise to some degree of fever, more or less continuous, whereas on later occasions there is no reaction till a large quantity of malarial toxin is liberated. This is an attractive theory which tends to be borne out by the fact that in relapse cases the fever assumes a tertian character at once. It is disappointing to find that the author does not seem to have attempted by blood examination to correlate the life cycle of the parasite with the initial fever. Does sporulation occur at regular forty-eight hour intervals, and thus bear no definite relation to the temperature chart, or does there occur an irregular sporulation, which later, coincident with the development of regular tertian fever, assumes a regular character? An observation of this kind would do much to prove or disprove the theory, but of course would be a very laborious one to make, as parasites at this stage are very scanty. Thomson and Woodcock (quoted) find that in primary naturally acquired cases sporulation of the parasites in the early stages synchronises fairly accurately, but at later stages advancement or delay in different groups of parasites may occur, causing an accompanying advance or delay in the febrile paroxysm.

Many other interesting observations are described and discussed. Although it may be said that as far as our knowledge of malaria is concerned, there is here nothing strikingly new arising out of its therapeutic use, nevertheless experimental confirmation has been given to many conceptions which were heretofore in the realm of speculation, and a perusal of the book cannot fail to be of interest to those whose lot it is to wrestle with this most interesting disease.

VENEREAL DISEASE: ITS PREVENTION AND SYMPTOMS AND TREATMENT.

By Hugh Wansey Bayly, M.C. London: Faber and Gwyer, Ltd.
Price 10s. 6d.

This is the third edition of the author's original work published in 1919. The present edition of 242 pages including an index, is divided into five sections dealing respectively with: Prevention, Syphilis, Gonorrhœa and finally with the "Patient."

The author is an official of the Society for the Prevention of Venereal Diseases and he reviews the whole question of prophylaxis and prevention in a comprehensive manner.

His accounts of syphilis, gonorrhœa and non-venereal lesions are concise and good and in accordance with the generally accepted views on these subjects.

The author's ideas regarding the interpretation of the Wassermann reaction are not altogether in accordance with our experience and teaching in the Army. Our conclusions are based on the findings of the test carried out as laid down by the Medical Research Committee. When the test is

carried out according to this standard, our experiences have proved that a positive Wassermann reaction is indicative of syphilis, either active or potentially active. The cases cited by the author in support of his thesis, that a positive Wassermann reaction does not invariably indicate any syphilitic taint, do not appear to be conclusive.

Contrary to Dr. Wansey Bayly's experience, we find that arsenobenzols when administered by routes other than the intravenous, give excellent therapeutic results; and no pain or discomfort need ensue if the appropriate preparation is employed.

In the author's opinion the value of the provocative injection of an arseno-benzol compound has not yet been proved. We constantly employ this method of provoking latent syphilis and are of opinion that it is one of real value.

We agree with the aut or that in treatment the patient is the first consideration and that up to a point, clinical signs and serological findings are only of secondary importance.

This edition is brought thoroughly up to date and is an excellent book for anyone requiring a good concise and readable account of the matter under review. The letterpress is reinforced by three coloured plates and seventy-four excellent illustrations conveniently arranged throughout the text.

THE OPERATIONS OF SURGERY. By Rowlands and Turner. London: J. and A. Churchill. 2 vols.; vol. i, pp. ix + 1046; vol. ii, pp. vi + 896. Price £3 10s.

For many years "The Operations of Surgery," which was originally written by Jacobson, has been a classic work. Those who were acquainted with the previous editions will welcome the appearance of this new and revised seventh edition. It is twelve years since the previous edition was published, and during this period so rapid have been the changes in the art of surgery that a great many additions, deletions, and revisions have been necessary. These alterations have been carried out with such care and skill on the part of the authors that the present edition has only been very slightly increased in size, although much new material has been added.

The main objects of the work are: (1) To give such a detailed and comprehensive account of surgical operations as to be of use to the junior surgeon and candidates for the higher examinations; (2) to provide a work of reference for the busy surgeon; (3) to give credit and fair criticism to any new work that seems worthy of consideration and trial. In these respects the authors have succeeded to an admirable degree.

Vol. i deals with operations on the extremities, head and neck, thorax and vertebral column.

Vol. ii deals with operations on the abdomen.

In dealing with special departments, such as gynaecology, ear, nose and

throat, and orthopædics, only well-established operations, that are likely to be of use to the general surgeon are described.

As in the previous editions, great stress has been laid on the indications for and against operations, and special attention has been paid to the difficulties and dangers likely to be encountered by the beginner. An interesting and instructive feature of the book is the description of clinical cases which are used to illustrate the text. The book is well and profusely illustrated by 900 figures, of which forty-three are in colour.

The work is thoroughly up to date, and will undoubtedly continue to hold its position as one of the standard textbooks on operative surgery which should be in the hands of every surgeon.

D. McK.

MODERN METHODS IN THE DIAGNOSIS AND TREATMENT OF RENAL DISEASE. By Hugh Maclean, M.D., D.Sc., F.R.C.P. Modern Medical Monographs. London: Constable and Co., Ltd. Third Edition. 1927. Pp. viii + 135. Price 12s.

We welcome a third edition of this well-known and popular monograph. Like its companion volume on "Glycosuria and Diabetes," by the same author, which has now reached its fourth edition, it is written chiefly with a view to the needs of the general practitioner, and aims at giving him a short practical account of the newer methods of investigating disease. All the more important tests for estimating renal function are described in detail, and full explanations are given as to the bearing of these estimations on the clinical aspect of the disease.

Practically no changes have been made in this edition, with the exception of the chapter on treatment, which has been completely rewritten so as to include a more detailed account of the various methods used in the treatment of acute and chronic nephritis.

The author still retains his simple scheme for the classification of chronic nephritis, which depends, not so much on the anatomical changes in the kidneys, as on the clinical aspect of the disease and its effect on renal function. Thus the azotæmic type is characterized by the retention of nitrogenous products, and the hydræmic type by the failure of the kidney to excrete salt.

Among the biological tests described, it appears that the urea concentration test and the estimation of blood urea are the most important, and both can easily be carried out in any clinical laboratory. The other tests also give useful information, but chiefly of a confirmatory nature.

The clinical aspects of the disease are also considered in detail, and the relative importance of the various manifestations such as the condition of the heart and blood-vessels, blood-pressure, œdema, etc., fully discussed.

It is shown that albuminuria may occur in a healthy young adult without any pathological significance, and methods are given for distinguishing this condition from true nephritis.

The chapter on treatment has been greatly improved in this edition, as the short notes in previous editions left too much to the imagination of the busy practitioner. No hard and fast rules for treatment can be laid down, but the details of special diets, and general management, cannot fail to be of great assistance to those dealing with cases of renal disease.

The whole book is written in a simple and lucid style, but at the same time it gives a full description of all the essential points necessary to obtain a clear understanding of the important new work on the subject.

THE DIAGNOSIS OF PANCREATIC DISEASE. By Robert Coope, M.D., B.Sc., M.R.C.P. 1927. Oxford Medical Publications. Pp. viii + 112. Price 5s.

This little book is a reprint of the Rogers Prize Essay in the University of London, 1926, and condenses clearly and concisely the extent of our present-day knowledge of a gland which, by the paucity of its symptoms when diseased, has been more or less a conundrum to succeeding generations of clinicians.

The opening chapter deals with the historical survey of diseases of the pancreas, dating from Endemus (circa 250 B.C.), the Alexandrine anatomist, who seems to be the earliest writer whose name is connected with the gland, to the recent work of Garrod, who in 1920 devoted his Schonlein Lecture to a summary of the diagnostic methods available for the study of pancreatic disease. From this we are led to the anatomical and physiological functions of the gland before the pathological and clinical aspects are considered.

To the senior student, the section dealing with clinical observations including X-ray findings, will prove the most interesting and useful. The subject of pancreatic cysts is explained at length and is illustrated by some helpful diagrams. The technique of duodenal intubation is also fully described and various tests for pancreatic disease are also set forth and simplified.

The book is a valuable contribution to the literature of a difficult and little-known subject. Korte has remarked that the diagnosis of pancreatic disease would be easier if only the doctor remembered that his patient had a pancreas. If only to stress this point the author is to be commended on producing a concise and readable work on the "Cinderella of the Abdomen."

R. L. R.

DISEASES OF THE THROAT, NOSE AND EAR. By Dan McKenzie, M.D., F.R.C.S.E. Second Edition. London: W. Heinemann. 1927. Pp. vi + 677. Price 45s. net.

The first edition, published in 1920, has been considerably enlarged to form the new edition, which is well printed and well illustrated. The subject is dealt with in a lucid manner, and the work deserves every success.

The chapter on note-taking and general semeiology is excellently written but fuller advice on the choice of a head mirror (avoidance of too heavy a pattern, etc.) would have been useful. Mention might have been made of electrical auroscopes which facilitate the examination of a patient in bed. Harslinger's directoscope is well illustrated and described, but its new merit of rendering direct vision and treatment of the larynx so easy might have been stressed.

The subject of the tonsils is well described. The fact that Davis's gag unduly stretches the parts of the pharynx when *in situ* might have been mentioned. For hæmorrhage after tonsillectomy mention might have been made of Major and Phelps' pressure forceps, which do away with the need for an assistant. In describing the treatment of epithelioma of the pharynx, the *excision* of the growth, using the diathermy cutting flame instead of "cooking" the growth *in situ*, is worthy of notice.

Tuberculosis of the larynx is excellently described, as are the methods of dealing with the skull sinuses. Howarth's operation for chronic frontal sinusitis is described and well illustrated.

The section on the ear is concise. It is interesting to learn that the author deprecates the use of cotton-wool plugs in the ears to minimize the effects of explosions, and suggests wax or plasticine.

The aural complications of fractured base of skull are well described.

The hints on neck dissections and the chapter on otosclerosis are very good.

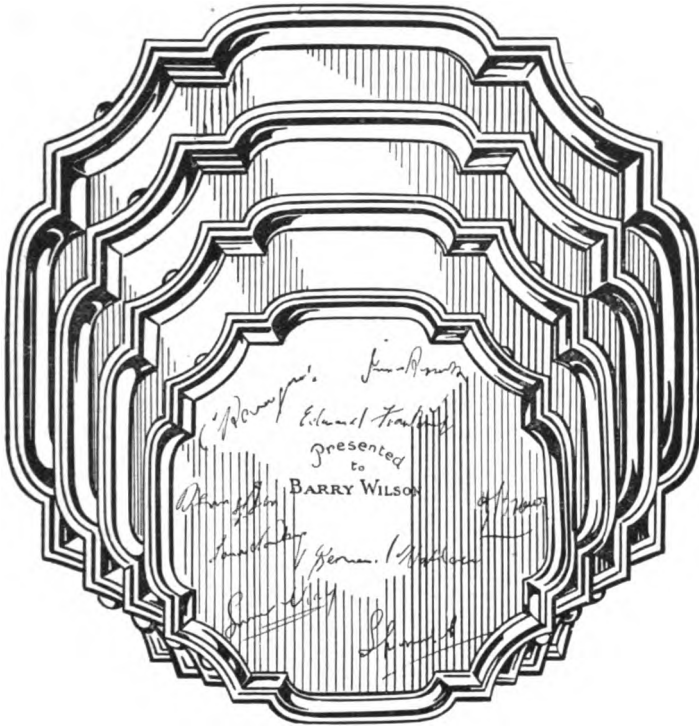
A small error occurs on page 64; "page 103," and not "figure 103," is meant.

The book can be thoroughly recommended to students and practitioners as a concisely written handbook on nose, throat and ear diseases.

THE ENDOCRINES IN GENERAL MEDICINE. By W. Langdon Brown, M.D., F.R.C.P. London: Constable & Co., Ltd. 1927. Modern Medical Monographs. Pp. vii + 144. Price 7s. 6d.

This monograph will supply a long-felt want for a short and easily readable treatise on the ductless glands and their internal secretions. The present-day knowledge and theories on the subject have been collected and classified, and at the same time much new ground has been broken.

The opening chapter is devoted to the biology of the endocrine system, and the second to a most interesting account of the endocrine system in childhood. Twenty pages are given to the thyroid gland, and contain much new matter. Emphasis is laid on the importance of the basal metabolic rate in estimating the progress of the patient, and the author stresses the occurrence of auricular fibrillation in cases of Graves' disease, and considers that the extension of the fibrillation to the ventricle may be the cause of the sudden death which occurs after partial thyroidectomy. The medical treatment of Graves' disease is exhaustively discussed.



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Possibly the most interesting part of the book is the section on endocrine-therapy. The author admits that the subject is still in its infancy, but considers that with co-operation between laboratory workers and clinicians further advances may be confidently expected.

The importance of insulin in diseases other than diabetes opens up new lines in treatment. The author considers it to be of great value in stabilizing weight and basal metabolism in cases of hyperthyroidism, and also in acute hyperthyroidism after operations on the gland.

The drug has given good results in hepatic toxæmias, such as from delayed chloroform poisoning, salvarsan, etc., and also in combination with dextrose to check nervous wasting in anorexia nervosa.

The book is in the usual attractive style of the Modern Medical Monographs, contains a good index, and should prove essential to those who require a knowledge of the fascinating subject of endocrinology.

R. L. R.

A COMPENDIUM OF AIDS TO HOME NURSING. By N. Corbet Fletcher, M.B., M.R.C.S. Third edition (revised). London: John Bale, Sons and Danielsson, Ltd. 1927. Pp. ix + 109. Price 1s.

This little book, which bears the sub-title "Home Nursing Simplified and Tabulated," is intended to supplement a course of lectures, and to facilitate study by means of tabulated statements and mnemonics. Elementary physiology, dietetics and the nature and causation of common illnesses are dealt with very briefly, and the precautions necessary in the case of infectious diseases are emphasized. The chapters on actual nursing duties are not sufficiently detailed to convey by themselves a clear idea of the work to be done, but they seem to fulfil the purpose of bringing out the important points, and of refreshing the memory of the student who has attended lectures and practical demonstrations. The fact that the book has reached its tenth thousand indicates its suitability for its purpose.

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Journal of the Royal Army Medical Corps.

Obituary.

LORD HAIG.

WE feel sure that the whole Corps and all those who were associated with the work of the Medical Service in France during the late War will participate in the common sorrow at the untimely death of Field-Marshal Earl Haig.

The personal qualities of the late Field-Marshal as a great soldier, a great Commander and a great gentleman have been justly appraised in the numerous tributes in the press, and will find a permanent place in the history of his life and work. For us it is only right—indeed, gratitude requires us—to place on record that Lord Haig gave unswerving support to the work of the Medical Service throughout the whole period of the War, and more particularly during the long and difficult years when he was Commander-in-Chief. It can truthfully be said that Lord Haig's broad-minded outlook on medical science and his clear understanding of the military advantages to be gained by the preservation of the health of troops, coupled with his genuine sympathetic concern for the welfare of every soldier under his command, had a powerful influence on the success attained by the Medical Service of the British Armies in France during the Great War.

As Commander-in-Chief Lord Haig kept in close touch with the medical situation and the development of the Medical Services by constant personal contact with the Director-General, who had direct access to him at all times, and who was specially charged to come to him whenever it seemed likely that his intervention or advice might be helpful. Moreover, the Commander-in-Chief invariably gave him confidential warning of the nature

of any proposed military operations on a large scale in order to ensure that he would be in a position to provide any additional medical aid that might be necessary from sources outside the immediate zone of the operations.

The trust and confidence which the Commander-in-Chief placed in the Director-General and in the personnel under his administration had an inspiring and stimulating effect on all phases of medical work, whether among healthy troops or among the sick and wounded. Lord Haig's personal interest in the restoration to health of the slightly wounded was unfailing, and his influence and the firm support which he extended to the officers of the Royal Army Medical Corps in command of the large Convalescent Depots did much to help them in their heavy responsibilities and facilitated the output of men so greatly needed to fill the gaps in the fighting ranks during the later stages of the War.

Lord Haig did everything in his power to show his appreciation of the efforts made by the Royal Army Medical Corps and its allied services by Mentions in his official despatches and by his personal thanks.

It is a matter for gratification that, throughout the War, his medical attendant was a regular officer of the Corps on his personal staff.

Looking back on those strenuous years, the happiest thought of all who formed part of the vast medical organization which served with the greatest army Britain ever raised will be that, in performing their work for the welfare of their comrades, they were carrying out the wishes nearest to the heart of the great and illustrious soldier who was their beloved Commander-in-Chief.



Original Communications.

THE DENTAL STANDARD OF THE RECRUIT.¹

BY COLONEL J. P. HELLIWELL, C.B.E.

Assistant Director-General, Army Medical Services (for the Dental Service).

THIS short paper deals only with the dental condition of men who present themselves for enlistment in the Army.

When one considers the different regulations governing the dental conditions under which recruits have been accepted, it is a matter of surprise how little they have varied in their actual intention. It is true that before 1923 there was no definite guide as to the number of effective teeth a recruit must have in order to be eligible for enlistment, but the fixing of this guide, or standard, did not affect the principle which has held since 1906, that a recruit must possess sufficient teeth for efficient mastication. It will be necessary for me here to give a brief résumé of the regulations which have been issued from time to time. The regulations in 1897 stated: "The acceptance or rejection of a recruit on account of loss or decay of several teeth will depend upon the consideration of the relative position of those which are no longer effective; thus, the loss of several teeth contiguous to each other in the one jaw leaving none to oppose those in the other jaw, would be a cause for rejection, but not the loss of a similar number distributed between the two jaws in different positions. Again, the loss of many teeth in a man of an indifferent constitution would point to rejection, while a thoroughly robust recruit who had lost an equal number might be accepted."

This instruction was very indefinite and could be applied differently in accordance with the interpretation of different individuals, and even in accordance with the different moods of a single individual, but, even so, the underlying principle was that a recruit should have sufficient teeth with which to eat.

In 1906 the regulations were altered to make it clearer that the retained teeth should be "so distributed as to permit of efficient mastication." This regulation conveyed the intention more definitely, viz., that a recruit must be dependent on his natural teeth for mastication. An Army Order issued in 1911 stated: "The acceptance or rejection of a recruit on account of loss or decay of teeth will depend on the consideration of the relative position of the sound teeth and the physical condition of the recruit; thus

¹ Paper read before the Naval, Military and Air Force Hygiene Group of the Society of Medical Officers of Health, on October 27, 1927. Printed by kind permission of the Editor of *Public Health*.

the loss of many teeth in a man of indifferent constitution would point to rejection, whilst a robust recruit who has lost an equal number might be accepted. Too much attention cannot be paid to this latter point."

This Army Order would appear to be a reversion to the less clear conditions of 1897, but this was not the case, as under the "Rules for the Inspection of Recruits," in the Regulations for the Army Medical Services, 1906, reprinted in 1914, one of the principal points was that a recruit should possess a sufficient number of sound teeth for efficient mastication and that a man presenting the following condition would be rejected: "loss or decay of teeth to such an extent as to interfere materially with efficient mastication." So there was no change in principle. What must have still disturbed medical examiners of recruits was the lack of any definite working standard as to the number of teeth which constitute the term, "sufficient for efficient mastication," and after the war, with the formation of The Army Dental Corps came constant demands from medical officers that some kind of working standard should be fixed. As a result, a definite standard on which the value of functional natural teeth could be calculated was published in the "Regulations for the Medical Services of the Army, 1923." For the benefit of those who are not familiar with the method of calculating the values of the teeth I will briefly outline it. The calculation is made on the teeth in the upper jaw only, which are functionally opposed to corresponding teeth in the lower jaw. Incisors, canines, pre-molars and under-developed third molars are given the value of one point. First, second and well developed third molars are given the value of two points. Consequently, if all the sixteen upper teeth are present and they are all functionally opposed to lower teeth, the value in points is twenty-two if the third molars are well developed, and twenty if they are not well developed. Men with fewer than eleven points were normally to be rejected. The teeth on which the calculation was based were, of course, to be sound, or in such a condition that they could be soundly restored.

As first published the instruction was not absolutely definite about the eleven points, but stated that a recruit with less than that number should "not as a rule" be enlisted. Later, in 1924, the eleven points standard was tightened and made the minimum dental requirement in recruits who were dependent on their natural teeth for efficient mastication. On the other hand, a great relaxation was made in the standard in that any man offering himself for enlistment who was in possession of suitable well-fitting dentures could be accepted if otherwise fit. Previously, only discharged men re-enlisting were accepted with dentures.

The method of calculating the dental points had of necessity to be made as simple as possible, as it had to be applied largely by medical practitioners without any special dental knowledge. An alternative method which grouped the teeth into a "grinder group" and an "incisor group" was rejected as being too complicated and less reliable. An exaggerated

importance is frequently given to molar teeth. I think it will be generally agreed that they have a greater individual value than the other teeth, but their greater value is only one of degree. A factor which must also be considered is the function of the tongue in guiding the food between the teeth, and this, where there is a deficiency in teeth, is more efficiently performed by the anterior third of the tongue, affecting the incisors, canines and premolars, than by the middle third, affecting the molars. I would feel quite as content with four functional incisors as with two functional molars, so far as mastication is concerned, and it is the general opinion of dental officers that the values given to the teeth in the present standard are as nearly as possible correct. So much for the standard, which, I would add, has apparently not proved a difficult one to apply.

It will be best at this stage to state the dental condition of the average recruit at present enlisted. His mouth is neglected, he does not clean his teeth, and he has had no dental treatment beyond an occasional extraction. An average of just over six decayed teeth requires treatment in order to make him dentally fit. Of these six teeth, four can be conserved and two have to be extracted. Caries affects other teeth to the extent of 1.25 each year during his Colour service, and it is now our aim to make every man dentally fit as a recruit and to carry out continuation treatment as the need for it arises, and by so doing to avoid the necessity for artificial substitutes.

The man with fewer than eleven points, besides having lost more than half his full masticating power, has, in addition to the larger number of teeth to be extracted, 4.75 teeth that require treatment by conservation, and it is on these defective teeth that the support of artificial dentures would fall to a considerable extent.

We will consider what effect the regulations have had from time to time on the number of men rejected for dental reasons on primary examination. I take the primary examination only, right through, because any man who happens to get into the Army below the dental standard is not now discharged if he will otherwise become an efficient soldier.

Records are available from 1893 to 1926, excluding only the war period, which show the number of rejections for different defects on the first examination, and I will give the outstanding percentages for dental reasons :—

			1.5 per cent	were rejected in 1893	
There was a rise to	2.7	..	in 1893		
and a fall to	2.0	..	in 1900		
The number rose to the highest figure of	7.2	..	in 1904	{	apparently as the result of experience gained in the South African War after the regulations were modified in 1906
It was	4.8	..	in 1907		
	5.7	..	in 1910		
and fell to	2.1	..	in 1913		
It rose to	3.5	..	in 1921		
	5.0	..	in 1922		
and there was a steady drop after the introduction of the present standard to	3.3	..	in 1925		
and	3.4	..	in 1926		

The mean percentage for the period before the war was 3·67; for the period after the war it was 3·95, and for the two periods combined 3·73. The present percentage of rejections therefore, as shown by the 1925 and 1926 figures, is smaller than the mean of either period and does not compare unfavourably with most of the individual years.

It is obvious that a fixed standard has not, as is frequently thought, increased the percentage of rejections. It has simply led to a uniform and most desirable interpretation of the Regulations, and has enabled medical officers to examine the teeth with as much confidence as they examine the rest of the body.

I have now made preliminary remarks on three points, viz: (1) The different regulations to be observed as regards the dental condition of a recruit; (2) the apparent effect of those regulations; (3) the actual dental state in which men present themselves for enlistment.

We must now consider the recruiting point of view, and this covers not only enlisting the medically ideal recruit, which everyone will readily admit is desirable, if attainable, but also the question of expediency in the case of recruiting being at a low ebb. Consequently we must not apply our ideals without due consideration of conditions as they exist in reality, and so ignore the common-sense side of the question.

When the intake of recruits falls below the required number it is quite natural that the limelight should be turned on to the medical causes of rejection, which amount to over one-third of the total number of men presenting themselves for enlistment. Loss or decay of many teeth is one of the large causes for rejection, and accounts for one-tenth of the total number, and is only exceeded by diseases of the heart, diseases of the middle-ear and defects of upper and lower extremities. On the other hand, dental disease is the most prevalent of all diseases and affects 100 per cent of the recruits. It is therefore to some degree gratifying to know that 96·6 per cent of the men can be accepted in spite of their dental condition. It is also a matter of speculation as to how many of the men rejected for dental defects would be rejected for other reasons if no account was taken of the condition of their teeth.

In deciding on the present dental standard special consideration was given to the difficulties that might arise from time to time in obtaining a sufficient number of recruits and, for this reason, what was considered to be the absolute line of demarcation between the dentally fit and unfit was arrived at. We should now consider in the light of our experience during the last four years whether or not a modification is desirable and possible, especially with a view to aiding recruiting. As previously stated, dental officers are unanimous in the opinion that the eleven points are the minimum with which a man can masticate efficiently, and that artificial dentures are necessary when the number of points is below eleven. I do not think there is anything unreasonable or savouring of specialism in this view. The dental officer simply finds that men who have lost a certain

number of teeth cannot manage their food satisfactorily, and it is a matter of no concern to him whether the dental value of the teeth in that state happens to be eleven or any other number. Assuming the views of dental officers to be correct, it is obvious that the great majority of men we enlist with fewer than eleven points require dentures either at once or very soon. Even in the cases where dentures may not be an immediate necessity in men below the standard, the remaining teeth are so carious or structurally poor that the dental surgeon can attempt very little beyond their temporary salvation, and artificial dentures must come sooner or later. There is one point, however, about dental disease and deficiency. They can be totally and permanently cured either by the conservation of teeth up to a certain stage of disease, or by extraction and the provision of dentures beyond that stage. No difficulty is experienced in this respect in civil practice, but in military practice it is the crux of the whole matter and immediately raises the question: Is it desirable and expedient to enlist men into the Service who are dependent on artificial dentures? As to the first part of the question I think most of us will agree that it is not desirable, but when the question of expediency is introduced we must hesitate and think again. Having thought again, we can only put clearly the pros and cons of the case, and leave it to the recruiting authorities to decide in view of all the circumstances whether the demand for recruits justifies the risk of accepting men of this type.

The advantages to be gained by the supply of artificial dentures to soldiers are: (a) The mouth is rendered clean and healthy, and the risk of septic or toxic absorption from that source is eliminated; (b) if suitable and well fitting, artificial dentures give a sufficient means of mastication, although they are a poor substitute for the natural teeth; (c) the number of recruits would be increased.

The disadvantages of enlisting soldiers who are or will be dependent on artificial dentures are:—

(1) The men can never be entirely depended on. The dentures are fragile and removable and are easily broken or mislaid either accidentally or wilfully. The numbers of breakages and losses were colossal during the war, and there was a constant stream of dentally unfits to the base for refitting. Further, the number of dentures repaired and replaced far exceeded the number supplied. On account of these difficulties men who are dependent on artificial dentures are not accepted for one section of the Reserve.

(2) The soldier has to bear the expense of any repairs or alteration to his dentures, so he is more or less able to please himself whether he remains dentally fit or not.

(3) In the case of the average recruit a considerable time would have to be spent in preparing his mouth for dentures. All badly diseased teeth would have to be removed and, in a man of that age, it would take from four to twelve months before dentures could be fitted, and his training

would be considerably interfered with. Another complication, as likely as not to occur, is the eruption of wisdom teeth during the waiting period, and this may delay matters for a very considerable time further.

(4) An increase in dental personnel would be necessary, costing roughly about £5 for each recruit of this type.

(5) There is another consideration which might be called the "unknown quantity." The teeth are living tissues, bathed in circulating lymph to the extreme limits of the dentine, and can therefore offer a larger or smaller degree of resistance according to the general condition of the body as a whole. This may be of some importance, and the loss by disease of half the teeth in a man of the average age of 19 or 20 should not be lost sight of in the consideration of the individual's general resistance. The teeth are, of course, on account of their position, more easily assailable than most tissues, but dental caries is not entirely due to local conditions, as is shown by the "arrested decay" or formation of "adventitious dentine" which sometimes occurs in individuals whose general resistance is improved by better food and healthier conditions of life. This adventitious dentine is really the dental equivalent to scar tissue, and can only occur in cases where the pulp of the tooth has not been infected. It is not likely to occur to any extent in young men whose resistance has been so low that most of their teeth are already irretrievably lost. I mention the point because it is frequently the custom to consider teeth as things apart, and not to take their condition into serious consideration in estimating general resistance.

So much for the advantages and disadvantages of artificial dentures in the Services.

I now wish to go back to the question of the present dental standard. If, for reasons of expediency, it is found absolutely essential to reduce it, more recruits will undoubtedly be obtained. Perhaps the best we could hope for would be the reduction of the number of rejections from the present 3·4 per cent to 2 per cent, which was the figure for 1913 and the lowest since 1893, and, assuming that the number of men presenting themselves for enlistment is about 60,000, we should get over 800 additional recruits each year.

An experiment is now being carried out in one of the Commands at home, whereby any recruit in robust health may be accepted, irrespective of the condition of his teeth. This experiment will continue for twelve months, and the results will be observed, chiefly from the effect on the number of recruits accepted who would otherwise be rejected, and also in order, if possible, more exactly to estimate the minimum number of natural teeth with which a man can carry on his duties as a soldier. The experiment came into effect at the beginning of this month, and up to to-day I have received thirty dental charts showing the exact state of the mouths of those men who are below the dental standard. The number of dental points of these men varies from four to ten. I will not make any

comment on them, but they are here and can be examined by anyone who is sufficiently interested. I have also three complete models of the mouth, ingeniously constructed by Captain Milnes, the officer in charge of the Army Dental Laboratories at Aldershot, so that any tooth can be removed in order to show any type of dental deficiency. So, in examining the dental charts, you may at the same time see what the condition actually looks like in the mouth.

You can see from the charts that many of the men possess sound or saveable teeth to the total of nine or ten points, and have also unerupted third molars. I think, in the circumstances, and if necessary, that some value might be given to these unerupted teeth, and that if a man has, say ten points and a likely additional third molar value on either side of the mouth, or nine points and a likely additional value of a third molar on both sides, then we should accept him. I give these unerupted third molars one point only, as in such mouths they are not likely to be well developed, and they will probably not oppose the teeth in the opposite jaw in the best functional manner. From the charts which have arrived already, nine recruits would be accepted under this heading, i.e., nearly one-third of the total number. This might have the effect of reducing the number of rejections to something approaching the 1913 figure, but the only fear I have in this connexion is that the average civilian medical practitioner examining recruits may not be able to judge whether functional third molars are likely to erupt or not. This question may be discussed.

Finally, I want to say a word about the recruits who have been enlisted with alleged "well fitting" dentures. This condition of enlistment was open to much abuse, even to the extent of men with hopeless teeth being told to have their teeth extracted and new dentures fitted in order to be accepted. A man would return in a few days' time with a brand new lot of teeth from the local practitioner—well-fitting, of course, for a few weeks—but in a short time they would be useless for mastication and, as the man could not obtain new ones at public expense, he would feel he had been badly let down. He would probably get into debt for his teeth, and the last thing he intended to do was to buy new ones. Actually, he would become useless as a soldier. Other men might appear with dentures fitted over a row of septic stumps by practitioners who had either no technical knowledge or no appreciation of their responsibilities. These would, as a rule, be passed by the medical examiner. I have here the models of such a man's mouth. This man still owed his relatives two pounds of the money advanced for the teeth, and he was not inclined to buy more. He was discharged from the Army, but had he been retained he would have been delayed at least six months at his depot, and his training would have been greatly interrupted before he could have been made dentally fit. These conditions led to a definition of the term "well-fitting dentures," which, among other things, required that six months should have elapsed between the completion of the extractions of the teeth to be replaced and the examination of the denture in the mouth.

I have, I hope, made sufficient preliminary remarks on a very controversial subject, and I would be glad if you examined these charts and models before proceeding with the discussion.

DISCUSSION.

The President (Major-General H. P. W. Barrow) : I am sure you will all agree with me that we have listened to a most interesting paper and one that gives us cause to think—Colonel Helliwell is to be congratulated on his choice of subject, and we welcome him and other officers of his corps to our sectional meetings.

Anyone who has had any length of experience in the Service appreciates how necessary is his corps to the well-being of the soldier in peace and to the efficiency of the Army when it has to take the field. Indeed, their labours are of great national importance, seeing that they ensure that the soldier is dentally efficient when he reverts to civil life.

Colonel Helliwell has given you a very fair statement of the situation as regards dental standards for enlistment since 1897, and I have little to criticize except that a fair comparison of the ratio per 1,000 examined, who have been rejected for loss and decay of many teeth before and after the Great War, is difficult, owing to the fact that, as a result of the experience of the South African War—where dental inefficiency was a great source of invalidity—for eight years the perspective of medical examiners of recruits was warped, and it was only when medical inspectors of recruits were appointed in 1909, and some uniformity of standard thus ensured, that rejections on this head became reasonable, and the ratio fell rapidly to 21 per 1,000, and if you omit the eight years I refer to you will find a ratio of rejections prior to the Great War of about 19 per 1,000, compared with a ratio post-Great War of a little over 39.

This, however, is by the way—the fact remains that since the eleven-point standard was introduced the ratio has fallen from 48 to 34 per 1,000.

Colonel Helliwell's statement of the state of the recruit's mouth nowadays is sad reading, and impresses upon one the necessity for increasing the activities of the school dental officers, and of medical officers of health as regards propaganda, if we are to arrive anywhere near the point where we get an approximately A1 population.

It must not be overlooked, however, that the state of the recruit's mouth nowadays is distinctly better than it was thirty years ago—I have been very struck by this fact during the last seven or eight years, when examining large batches of recruits and serving soldiers.

The problem of fixing a dental (or in fact any other standard) for enlistment is an extremely difficult one. One cannot help agreeing with Colonel Helliwell that on the face of it a reduction below the eleven point standard is most undesirable; in fact, it appears doubtful whether such an individual can masticate efficiently. At the same time there is no doubt about it that there are many men below this standard who do manage to

keep fit and robust in spite of this deficiency, and in the present state of recruiting it is difficult to uphold our rejection of these men. I could give many instances of such individuals who have served efficiently; one, a corporal who was middle-weight champion of the Army in boxing at the time, who on coming up to extend his service was found to be edentulous. An addition of 800 to the numbers recruited is not to be regarded lightly. Of course it will be argued that if we revert to the 1906 standard, when robustness was the main criterion of fitness, it will be running the risk of a repetition of the experience of the South African War; but I really do not think this need be feared, as there will never be another war fought on bully-beef and the old "dog" biscuit. The modern field service ration can be tackled by anyone.

As Colonel Helliwell has stated, we are carrying out a year's experiment in a command where deficient teeth has always been a high cause of rejection, and when we get the result of this experiment we may be in a better position to discuss this question.

It may be that we shall find that by adding one point for unerupted wisdom teeth we shall be able to pass the more desirable of the recruits at present below the eleven point standard. If so, so much the better, as there is no doubt some definite standard for examining medical officers is more satisfactory than anything less exact.

In the few years immediately prior to the war, there was a low rate of discharge within six months of enlistment and of invaliding, and, from a careful examination of the reports on the health of the Army, there was no increase of hospitalization for diseases of the digestive system or anything that could be accounted for by inferior dental condition.

Lieutenant-Colonel Cowey, R.A.M.C., stated that he considered the standard for teeth was high. He thought it was absurd to reject a man of fine physique with ten points and enlist weedy men with eleven points. He suggested that the standard should be reduced to nine points, including two for molars, or to ten points irrespective of molars. The force sent to France in 1914 was the finest force that had ever left this country, and there was no dental standard in those days. He also considered that men with an "open bite" should receive special consideration if their teeth were sound.

Surgeon Captain (D) Fletcher, R.N., stated that the dental standard for entry into the Navy appeared to be more elastic than that for the Army. The standard of dental "points" as applied in the Army had certain definite advantages, and the minimum number of teeth required in recruits appeared to be placed at the lowest figure consistent with reasonable efficiency. In the Navy the numerical requirements were graded according to the age of the candidate. Five defective or deficient teeth in boy candidates for seamanship (aged about 15), seven in other candidates below the age of 17, and ten in those above that age were generally regarded as a cause for rejection. Credit was given for unerupted teeth in the case of candidates below the age of 17, but all classes of candidates were required to possess

adequate molar occlusion, preferably on both sides of the mouth, but asymmetrical molar deficiency was not necessarily a bar. The remaining teeth were to be in good condition and occlusion. The general condition of the mouth was also taken into consideration, and candidates presenting badly diseased gums were not accepted, owing to the probable premature loss of teeth when that condition was present.

Arrangements were made for the "provisional" entry of candidates if the final examining medical officer was in doubt on points requiring more expert dental examination, e.g., the possibility of conserving a tooth upon which the acceptance or rejection of a candidate might depend. Such candidates were re-examined dentally at the final entry establishments, and, if unsuitable, were rejected and returned to their homes, thereby saving the cost to the State which invaliding would involve. No candidate was accepted for entry who was dependent on dentures, but men might be re-entered or re-engaged if below the numerical standard, provided they were wearing well-fitting dentures.

The disadvantages of dependence upon artificial substitutes were probably greater at sea than on shore. The difficulties in replacing lost dentures, or repairing broken ones, were considerably greater; and the loss of a man through sickness, consequent upon dental deficiency, was more likely to upset routine in a ship, where the complement was necessarily restricted, than would be the case where such limitations did not exist. It was necessary, therefore, to reduce the need for dentures in a sea-going force to the minimum.

He considered that when there was an acute shortage of educationally and physically fit recruits, and it was necessary to reduce standards in order to secure sufficient numbers, it would seem desirable that any necessary modification should apply equally to all standards, rather than that any one should be singled out for reduction.

Squadron Leader Macdonald, R.A.F.M.S., said that the dental standard in the Royal Air Force was on the lines of the earlier Army standard, i.e., that a recruit must possess sufficient teeth for efficient mastication and that sound molar opposition must be present. Credit could be given for unerupted wisdoms, but sound molar opposition must also be present. This standard applied to unskilled men. As regards skilled men, these could be dentally accepted provided they could efficiently masticate their food by natural or artificial means, i.e., a recruit with complete dentures, upper and lower, could be thus accepted; such dentures must be well-fitting. The procedure in the Royal Air Force was finally to examine practically all recruits at Whitehall. In the case of men living at a distance, a preliminary medical examination was conducted by selected civilian medical practitioners; if they found a recruit dentally unfit, or were in doubt as to the state of the teeth, they completed a simple numerical dental chart, on which sound, saveable, unsaveable, deficient and unerupted teeth were indicated by special signs. These charts were then examined by the

[illegible]

Medical Inspector of Recruits, who decided as to whether or not the recruit should be called up for final medical examination. He was in favour of Colonel Helliwell's suggestion that a recruit might be dentally accepted, although sound molar opposition might not be present, if he had unerupted wisdoms, and provided the rest of the teeth were satisfactory.

Lieutenant-Colonel Harvey, R.A.M.C., doubted whether the Royal Navy and Royal Air Force could be compared with the Army, as one Service might not have the same difficulties as regards recruiting as another.

Lieutenant-Colonel Howard Jones, R.A.M.C. (T.A.), spoke of the appalling state of the teeth of a large number of men in the Territorial Army at the outbreak of the war. He considered that much was to be done in the prevention of dental disease, and that the institution of ante-natal clinics and child welfare centres should eventually be of great value in this respect.

Colonel Helliwell, in reply, stated that General Barrow had indicated the key to their dental difficulties when he advocated an increase of school dental officers. When the happy day arrived that all children could be adequately treated, the need for discussions on the subject with which they were now engaged would cease. General Barrow had said that when the dental conditions had been relaxed there had been no increase in hospitalization on account of diseases of the digestive system. That might be so, but the effect of a sound dental standard and good treatment would, it was hoped, result in an actual decrease in those cases. In one command abroad, where dental treatment was of a high order, the dental officer had attributed the steady fall in these diseases from 130 per 1,000 in 1923 to 72 per 1,000 in 1926 to the fact that dental disease had been practically eliminated in the Command. With regard to General Barrow's statement that in the present state of recruiting it was difficult to uphold the rejection of those men who are below the standard and who do manage to keep fit in spite of their dental deficiency. As regards Colonel Cowey's remarks that it was absurd to reject a man of fine physique with ten dental points and accept an inferior type of man with eleven points, he must repeat what he had clearly stated in his opening paper, namely, that dental officers found that the teeth in the vast majority of men with fewer than eleven points were so diseased and structurally poor that, in spite of their efforts, dentures would in practically all these cases become a necessity. It was, therefore, a question of policy and expediency as to whether men who were, or would be, dependent on dentures should be accepted. The advantages and disadvantages of these appliances in the Service had been stated, and it must be left to the authorities to decide whether such men should be accepted or not.

Colonel Cowey's view, that the standard was too high and that it should be reduced to nine points or ten points, was purely a matter of opinion, and did not coincide with the view of dental officers. If the number of points had been fixed at nine or eight, there would always be individuals who

would like to see it modified to eight or seven. They would still have the apparently strapping man with his eight points and the weed with his nine points—so the question again returned to the policy regarding dentures. He did not agree with Colonel Cowey that the 1914 Expeditionary Force had no dental standard. There was not then a uniform standard, but every recruit was required to have "sufficient teeth for efficient mastication," and the fact remained that there had been a drop in the number of rejections from 5 per cent to 3·4 per cent since the introduction of uniformity in the dental examination. He agreed with Colonel Cowey that there were many cases of "open bite" in which the teeth were strong and healthy, and where it was obvious that some of the teeth, which in the normal-closed position of the mouth did not oppose those in the opposite jaw, did actually have a functional value in mastication. He would accept a man with this condition if he was otherwise in robust health.

With regard to Surgeon Captain Fletcher's remarks on the naval standard, Colonel Helliwell thought that difficulties might occur in its application. It might be that a man had lost ten teeth from one jaw, or five from each jaw on different sides of the mouth, and he would then be badly off dentally. Many variations in dental values could occur, and he was of the opinion that a precise standard was more desirable. [Captain Fletcher interposed that the examining medical officer must be satisfied that a man had a sufficient number of opposing teeth.] The state of the oral tissue was not made a special point in the Army because the standard ensured that a man had eleven points in sound or saveable teeth.

Squadron Leader Macdonald had stated that the Royal Air Force requirements were somewhat similar to the old Army ones. It would have been interesting to hear from the Navy and Air Force representatives what the percentage of rejections for dental reasons was in those Services. [Squadron Leader Macdonald remarked that in the Air Force "it was 6·7 in 1924, 5·9 in 1925 and 6·9 in 1926." Colonel Helliwell said in reply that these figures appeared to be double those for the Army, to which Squadron Leader Macdonald agreed.] There was no doubt that there was a great field for propaganda in the manner indicated by Colonel Howard Jones, and much could be done in the prevention of dental disease. Unfortunately, this could not bear much fruit in the present generation, and it was necessary, therefore, to combat the evil, as it existed at the present time, in the Services.

DIARY OF A D.A.D.M.S. ON THE JERUSALEM CAMPAIGN,
PALESTINE, NOVEMBER-DECEMBER, 1917.

BY LIEUTENANT-COLONEL H. F. HUMPHREYS, M.C.

Royal Army Medical Corps (T.A).

(Continued from p. 104.)

November 13.—The objective for to-day was to turn the Turks out of the wadi Janus line before they had time to dig in ; the 52nd Division were to attack Beshit and Katra while we moved along the coast and turned the Turkish right. The 6th Brigade went on in the night and were to take the brunt of the fighting, so we sent on their F.A. complete, and as soon as the morning sick had been evacuated by ambulance car to Julis, we brought up the 8th Brigade Tent Section along the coast road to Tel Karrube and opened them up as a Divisional Collecting Station ; the 22nd Brigade Tent Section we kept in reserve.

Divisional Headquarters moved on to Tel Karrube about 8 o'clock, and there we stayed all day ; all direct view of the fighting was hidden by the ridge east of the road, but by midday we heard that the 8th Brigade had taken Kebna, and towards evening news trickled through of the great charge of the 6th Brigade against Mughar ridge, which had taken 1,200 prisoners, 16 machine guns, and turned the whole Turkish line of the wadi Janus. We could get no details of casualties and the 8th Brigade Tent Section had opened up before the first trickled in. However, we left the 22nd Tent Section beside them in case of need, and when, later on, we got a message from the 6th Brigade reporting about 150 casualties got the 22nd Section opened up as well. At dusk Divisional Headquarters had moved to just south of Jebna, and, after arranging things at the collecting station, I pushed on into Jebna to find water for my horses. It took me an hour to find Divisional Headquarters, as the whole plain was full of cavalry of the Anzac Division, who had moved up in the afternoon, and it was a very dark night.

November 14.—We had heard from the 6th Brigade F.A. that they had established a dressing station for their casualties on the Mughar ridge, and at dawn all spare cacolets from the 8th and 22nd Brigades Tent Sections had been sent out there to assist in getting them in. So after breakfast I rode out to Mughar to see how they were getting on. Not many horses appeared to have been killed during the first part of the charge, although the Brigade had had a gallop of two or three thousand yards across an open plain ; but as I got to the foot of the ridge carcasses were dotted about more thickly, and there was a clump of thirty or forty where the 6th Brigade dressing station was. The brigade had gone on with the rest of the Division which was attacking Naaneh to-day, and Colonel M. was a bit worried at the slowness of the evacuation. It was three or four miles to the collecting

station, and though the going was good the tired mules and camels seemed simply to crawl. He had about forty wounded Turks on his hands, in addition to the British, and hearing there was a Turkish doctor amongst the prisoners, I went across and dug him out, together with a couple of Red Crescent orderlies. We walked over to Mughar village, and I saw the Sheik, commandeered his best house for a hospital, and told him he must feed the wounded till they were fetched away. It did not take long to get the wounded Turks in there, and I then put the Turkish doctor in charge, with a couple of Yeomen borrowed from the prisoners' escort to act as guard. This relieved Colonel M. considerably, and by one o'clock he had all his casualties cleared and was able to push on after his Brigade, while I rejoined Divisional Headquarters, who were on the top of Mughar ridge, just above Akir. One had a magnificent view of the towering Judæan highlands, with the stony ridge of Abu Shushesh standing like a sentinel at the mouth of the Ajalon valley, and near at hand the Zionist settlements Akir and Deiran, with their vineyards and orange groves; it was startlingly like California—the same fruit orchards and cool verandahed villages, with Judæa standing for the Sierra on beyond. The noise of desultory firing drifted back to us, but we were obviously not up against much opposition, and one could see squadrons going to water at the village wells. Our next tough job was to be the attack on Abu Shushesh next day. It was a relatively idle afternoon for us; someone bought a sheep at Akir, and some fruit, and we had a cooked dinner for the first time. It was pleasant to come across even a thin trickle of milk and honey, and what with that and the consciousness of victory, we all felt rather happy as we stretched our tired limbs and rolled up in our blankets for the night.

November 15.—The Division was attacking Abu Shushesh to-day but Headquarters remained where they were. The A.D.M.S. and I were getting a bit anxious about the clearing of the collecting station where by this time about 250 cases had accumulated. Evacuation was back to the receiving station at Julis and our five Ford cars couldn't make much impression on the large numbers that had collected. In fact we felt more acutely than ever the disadvantage under which we had lain from the first—namely, that our supplies had been so irregular and the dumps from which every few days we drew them so far back that we had never been able to use motor lorries to evacuate our sick and wounded. "Q" branch rarely knew beforehand where supplies were coming to, and when they did forgot to inform us. I was just about to ride off and see what could be done when I saw through my glasses a long train of motor lorries a mile or so this side of Jebna and returning south. I could obviously never catch them on a horse, and there was not a moment to lose if I was to intercept them, so I leapt straight into a Ford car belonging to the Light Car Patrol Detachment we had with Headquarters and dashed off in pursuit. The driver was an Australian, a sporting fellow, and we went at a breakneck speed across wadis and fields and intercepted the head of the convoy before it wound out of sight. I discovered it was the Desert Mounted Corps convoy

which had just dumped supplies for the Anzacs and ourselves, and with a bit of bluffing I soon persuaded the young and tender subaltern in charge to diverge from his orders to the extent of picking up our casualties. His chief fear was that of getting his lorries stuck, but I lied stoutly and said that I knew an excellent track leading straight to our collecting station, while I painted such a rosy picture of the coast road back to Gaza as compared with the cross country route he had come up by that his last scruples vanished. I did, as a fact, get his convoy safely over the ridge to the collecting station where I was hailed with rapture. The cars had evacuated most of the bad cases in the twenty-four hours and we got all the rest—between two and three hundred—on to the lorries. I had even enough room to spare to play the good Samaritan and lent lorries to clear fifty cases for the New Zealanders and fifty more for the 52nd Division, all of whom were in like case with ourselves as regards evacuations.

I left the collecting station with orders to pack up and stand by and motored back to Headquarters. Here I learned that Abu Shushah had fallen after an exciting fight ending in another brilliant charge by the 6th Brigade and that the Division was moving into Ramleh for the night, so I went back to bring along the collecting stations as there was no means of signalling to them. I rode back with my horses and we were soon on the road to Ramleh. Daylight began to fail by the time we had crossed the plain beyond Jebna and were winding through the vineyards and orchards round Deiran, so hitting an open meadow just off the road we bivouacked for the night. Tea was boiled and the four of us—S., H., Padre H., and myself—had a right merry meal and sat up yarning over our pipes for an hour. It was a lovely night of blazing stars, with the scent of the fruit-laden trees drifting across in slow waves as the light wind rose and fell, while the mellow chimes of Ramleh Convent told the hours and the watch-dogs barked. We all felt that our troubles were over for a few days and enjoyed the profound peace of the evening after the strenuous days we had lived through for a fortnight.

November 16.—We had breakfast betimes and then rode into Ramleh where the two tent sections rejoined their respective field ambulances. I found Headquarters installed in the Convent. I learned from the A.D.M.S. that the Australian receiving station had moved up to Jebna the day before, so we evacuated our casualties from Abu Shushah (they had been brought in to Ramleh) thither by motor ambulance. We found a lot of sick and wounded Turks in the town and these we also sent to Jebna by the Divisional train which had just caught up with us for the first time since Beersheba.

This arranged I set to and had a bath; it was the first wash I had had since we left Shellal and of course the first time I had had my clothes off, but the comfort of it was somewhat marred by the necessity of getting back into my dirty kit.

In the afternoon I strolled round and started some sanitation going at Headquarters as it was rumoured we were to be here a day or two.

Neil Primrose, who had been killed the day before at Abu Shusheh, was buried in the Convent garden in the afternoon.

We had a great dinner that night with fruit and some brown bread of the country : it was good to see a chair and table again and the Jaffa oranges tempted us all to excess.

November 17.—Still at Ramleh. I went round to the field ambulances and found them all crying out about the shortage of dressings and bandages, as we had had no chance of replenishing our supplies. There was a Franco-Syrian chemist in the town, but all his stock had been taken by the Turks. Seeing a bandage roller in his shop I had an idea : I sent for the only cloth merchant in the place, and finding he had sixty yards of linen, requisitioned the lot, borrowed the bandage roller from the chemist, and sent it all to the 22nd Field Ambulance, who made 200 bandages. I then arranged with the A.P.M. for all first field dressings from unwounded prisoners to be collected by the M.P. and handed over to me for distribution, so that in this way we replenished our stocks after a fashion.

I wandered round Ramleh a little to-day. The big mosque was the old Crusader Church, practically untouched ; the Moslem fittings, mihrab, dikka and the rest are housed in the old south aisle, and the three apses to the east are still intact. It was a heavy, unpretentious building, built in very early transitional style. The finest thing in Ramleh is the white tower of Sultan Baybarg : it is a faithful copy of the French late transitional style, and all round about lie the ruins of the mosque built by the founder of Ramleh.

In the afternoon I washed my clothes and had to sit about in a Burberry till they were dry. We were in hopes that our kit and batmen, last seen at Beersheba, would overtake us here, but there was no sign of them.

November 18.—The 8th Brigade started up into the hills to-day, and towards evening word came back that wheeled transport was impossible beyond Annabeh : so we decided that for the forthcoming advance we would have the 22nd Tent Section at Ramleh, leaving the cars there to clear its casualties to Jebna. The 8th Brigade Tent Section was to be at Annabeh, evacuating to Ramleh by sandcart, and the 6th Brigade Tent Section in reserve for orders to explore possible roads and move up as near to Beit ur el Tahta as the going permitted. It was obvious that the camel cacolets would be the only transport available up in the hills, so we distributed all we had evenly between the three bearer sections.

November 19.—At 8 a.m. the Division started off on its march up into the hills. It was a cool, cloudy morning, and before afternoon it turned to rain, our first since we left the canal ten months before. The going up Annebeh was fairly open, but after that the column wound its way up boulder-strewn valleys, ever getting steeper and more rocky. We kept to the old Roman road, passed Berfilya and Suffa, and late in the afternoon reached Beit ur el Tahta. There had been no fighting so far, as the 8th Brigade had made all this country good the day before, and at Tahta we bivouacked

for the night. All the hillside at Tahta was pitted with cisterns, most of which still held some water from the last season's rains. It was now raining sharply, and we had a wretched night, cowering under the scanty protection of our ground sheets and chilled to the marrow, but we slept somehow.

November 20.—We started off soon after daylight, our object being to cut the Nablus-Jerusalem road and establish ourselves across it at Bireh; it seemed an ambitious programme, but we were told not to expect any organized opposition, and in the light of a grey dawn we could see units of the 52nd Division moving parallel to us along the ridges to the south, the men threading their way in Indian file and the camels in long strings. As soon as we left Tahta and started to climb up to Beit-ur-el-Foka the going got worse than ever. The guns which had been hauled up somehow as far as Tahta had to be left behind, and the old Roman road, though clearly marked, was so choked with boulders that it was impossible to ride our horses, and from now onwards we walked and led the horses. We made Zeitoun Hill without much opposition, but after that progress slowed down a lot, while the advanced guard cleared out the clusters of snipers that were holding us up. They were pretty active, and a native guide we had was shot through the stomach. He was dressed in white, and made a good mark against the rock, and the same sniper had several shots at me while I was dressing him—fortunately all misses. As we neared Beitunia, resistance stiffened considerably, and it became evident we should get no further in the hour or so of daylight that remained, so Headquarters settled down for the night, well sheltered under the lee of a terraced hill that gave good standing to the horses. We were sniped a bit here, but nothing serious. We were over 2,000 feet up, and it was very cold for the men, most of whom had had nothing to eat all day, and just as dark came on down came the rain in torrents. As bad luck would have it, one of the signallers was shot through the neck just before, and while dressing him and getting him into shelter I got soaked to the skin. However, there was nothing to be done, so I rolled up in a blanket between a couple of boulders, hungry and shivering as I was, and let the rain do its damndest. I was so tired from the long day's scramble and holding my horse up on the rocks that I managed to sleep in spite of everything.

November 21.—Luckily, a fine sunny day dawned, and though stiff and hungry, we began to get warm and dry. The 6th Brigade were attacking Beitunia, and at dawn we started off some casualties on the long march back to Annabeh. It was as near as we had been able to bring up a tent section or anything with wheels, and we depended for evacuation entirely on the cacolet camels. There was very little for the A.D.M.S. or me to do as the 22nd Brigade was away on the left at Ain Arik guarding our flanks, and for the time being out of touch. Only the 6th and 8th Brigade Bearer Sections were with us, and they both had dressing stations under brigade arrangements pitched under the lee of the same hill that sheltered

us. So I sat about, and every now and then went to the top of the hill to watch the fight. It was evidently going to be a tough business, for the Turks treated us to a good deal of shelling, and we had nothing to give in reply except the little mountain guns of the Hong Kong and Singapore Battery. The Sikh gunners hauled their funny little popguns about amongst cheers and laughter, but they hadn't much ammunition and nobody believed they were doing much good. Casualties began to come in towards the end of the morning, and in the afternoon we had still failed to take Beitunia, while the Turks were obviously being reinforced, and their fire got hotter and hotter. About 4 o'clock they put in a strong counter-attack which swept us off the hill we had just taken commanding Beitunia, and was only just stopped in time to prevent the whole lot of us getting scuppered. We were now palpably outnumbered, and not only without hope of reaching the Nablus road four miles away, but in a very dangerous position ourselves. So a retirement was ordered and the 6th Brigade began to stream back under the lee of our hill. The Turks must have spotted this, for just when the whole side of the hill was covered with troops they treated us to twenty very lurid minutes of howitzer fire. The hill was so steep that it had seemed impossible they should reach the reverse side, but they systematically quartered the whole ground till it seemed as if nobody could escape being hit. A good many horses and camels began to fall, but the men crouched against the leeside of the rocky terraces, and it was some minutes before I went out with a haversack in response to the cry of "men hit." By the time I had dressed a couple of men the shelling was over, and when we came to look round the total casualties to men were only half a dozen or so. A lot of shells had fallen plump into the dressing stations without doing any harm, and though I was hit a number of times by flying stones and a number of shells had burst within a few yards of me I was quite unhurt. But the toll of wounded animals was heavy, and our revolvers were all busy for a few minutes putting them out of their pain.

Everything now began to move back, but the General kept out a thin rearguard to help us get in the last of the wounded. The A.D.M.S. went on with Headquarters and I stayed behind to clear the dressing stations. We only had about thirty camels between the two bearer sections and we put the worst cases on these, mounting all the others on horses. Even broken legs had to go on horses and I was prepared for a number of broken necks as well, as it seemed impossible that any animal should keep its footing in the dark amongst those awful boulders. Even in daylight sound men had not ventured to ride, and it seemed like murder to put badly wounded men on to tired horses for such a journey. But it was our only chance as we might be rushed and lose everything at any hour. By 7.30 I judged we had practically all casualties in and after carefully counting horses and camels formed them in a string, 6th Brigade cases in front, 8th Brigade behind and led the way back to Beit-ur-el-Foka. It was tricky steering as the winding wadis made it impossible to keep to a compass bearing and a slight deflection would have sent us

straight into the arms of the Turks on our flank. (This actually happened to a ration party going up from Foka a couple of nights later.) I walked in front leading my mare and threading a precarious path over the rocks and we began to make progress. Halts were frequent: the camels were dead beat, having had no water for five days and no food for two, and at every check they promptly knelt down and had to be half flogged half lifted on to their feet again. The Egyptian camel drivers were fine, they were hardly better off than their beasts but stuck to it like men. Luckily the horses kept their footing in marvellous fashion and I wasn't aware of a single fall. For an hour and a half we made slow progress through the darkness and then I bumped into a squadron of Rough Riders taking up a line on Zeitoun Hill which was to be our outpost line next morning. This was a great weight off my mind as I knew our direction was all right so far, and in another hour I made the first house of Foka. I called a halt here while I walked on to find a possible track round the village (it was too narrow for cacolets between the houses), and to look out a suitable place to doss down for the night: after half an hour I came back and led the weary procession on to the olive yard I had selected for our night's rest. I counted them in—first the horses and then the camels of the 6th Brigade, from which none were missing. B. brought up the rear and then came Major B. of the 8th Brigade. To my dismay, after counting in half his horses the procession stopped, about twenty horses and fifteen camels being missing. Major B. was obviously whacked, so leaving him and B. to get the wounded already in settled for the night, I set off back again by myself. Up the hill to Foka and then I heard groans amongst the houses and found a pretty kettle of fish. The lost horses which should have been in front had vanished into the blue and the camels had blundered into the houses and got stuck. The first one I found had the cacolet jambed into the branches of an olive tree, the native driver curled up asleep between the camel's feet and the wounded unable to do anything but reiterate querulous curses: the next camel had knelt down between a couple of houses and nothing could get it up, so finding an R.A.M.C. orderly we lifted the cacolets bodily off its back with the wounded inside and carried them out of the way, finally getting the camel thus lightened on to its feet. Then more groans and striking a match I found a camel with its back broken lying in a ten-foot hole with the remains of a smashed cacolet underneath, luckily both passengers had been flung clear and were too badly wounded to care much about the fall which hadn't killed either of them. Beyond the block caused by these three casualties, I found the rest of the cacolets huddled together beyond the village, the R.A.M.C. orderlies too tired and lost to do other than stay where they were till found. However I took some of them along the track to our bivouac ground and when I saw the whole party well under-way we went off in search of the missing horses.

November 22.—It was now well past midnight, but I reckoned that the horses having been in front must have gone to the right of the village (we

had skirted it to the left), so I tramped round that way and presently struck the old Roman road, now nothing more than a stone-bestrewn pathway. This seemed a likely trail for lost men to have followed, so I pushed on along it with many casts to right and left, and, sure enough, about a mile further on found the missing horses—the wounded still in the saddle—halted in a group: the orderlies in charge, feeling themselves lost, had sensibly halted and were casting round, trying to get into touch with the rest of the convoy; so I led them all back to our olive yard, and we soon had all the wounded off-loaded and settled for the night. It was just 3 o'clock as I rolled myself, tired and footsore, into my blanket. I was up at 5 o'clock, and having seen the two bearer sections started on feeding and dressing the wounded, went out to find the A.D.M.S. Headquarters were only a few hundred yards away, and we discussed the situation over tea and biscuits. The situation seemed to be that we were to hold on to the line of Zeitoun Hill, where we protected the flank of the 52nd Division who had reached Nebi Samwil, a mile or two from the Nablus road without much trouble. It seemed unlikely the Turks could attack in force for a day or two, as they had to get their guns up, and there seemed a chance of a quiet couple of days. We did not want a battle as we had no available transport for wounded; indeed, it was obvious that many of the cases we had brought away on horses the night before would be unable to ride to-day. But we were expecting more cacolets back from Annabeh to-day, so we decided to send all cases who could ride on horses, fill up the available cacolets with bad cases, and keep the remainder till cacolets became available. I gave orders to the bearer sections to this effect and we started off about eighty cases on horses by 9 o'clock, sending Y. of the 8th Brigade to take them back to Annabeh. It was a slow business getting the cacolets loaded, and by the time we were finished a dozen more turned up from Annabeh, and in the event this enabled us to clear all our wounded at once. The two bearer sections had only a couple of M.O.'s apiece now Y. had gone, so I suggested to the A.D.M.S. I should guide the camel convoy back myself, as it did not seem probable there would be much work for me for a day or two. So about 10 o'clock I started off; as far as Beit-ur-el-Tahta the going was as bad as the night before, and it took us two and a half hours to do the three miles. On the way I passed Colonel E. with a gang of impressed villagers tinkering up the Roman road; he was trying to get his guns up to Foka. When I finally got clear of Tahta, I halted to let the last camels catch up, and dealt out morphia and water to the wounded, as well as picking up rations and medical comforts from the refilling points I found there. For in the three days since we left Ramleh supplies had been busy, getting a road of sorts cleared, and limbered wagons were now getting up as far as Tahta, which presented a busy scene. From there on to Annabeh everything was plain sailing; the limbers had beaten the rain-soaked earth into a very tolerable track which had now dried hard and firm: I even found a sand cart at Tahta, one of four that Colonel M. of the 6th Brigade Field Ambulance had sent up on spec., but the others had all broken down on the

way as the ribs of rock running across the road were too much for anything with springs, though negotiable with limbers. I heard from the sand cart drivers that Colonel M. had got his tent section on to Berfilya three miles this side of Annabeh, and I thought I should do well if I got my tired camels as far as that by nightfall. Luckily we could now push on without any halts and gave the camels no chance of kneeling down: so without further adventure we made Berfilya and Colonel M.'s dressing station just before 6 o'clock.

Colonel M. was single-handed, and we set to work sorting out the cases, dressing and feeding them and making them snug for the night. They had stood their awful journey surprisingly well, and though two or three died in the night, the rest were much better when we came to start them off next morning. An M.O. of the Imperial Camel Corps turned up with about forty cacolet camels at 6.30 p.m. Desert Mounted Corps had heard of our casualties and the D.D.M.S. had sent him up to help us clear them. He was relieved to hear we had got them all away and set to work to help us dress the wounded. By 8.30 we were all through, and then I licked my lips over the first cooked food I had tasted since Ramleh, to be followed by a solid nine hours' sleep.

November 23.—I got up at 7 o'clock and sent the camels off to the well for water; I found we could clear most of the casualties from Berfilya by the I.C.C. cacolets, so after they were loaded I sent them straight into Ramleh, where I heard the Anzac Receiving Station was established. The few that remained we got away by sand cart, and that left the 6th Brigade Tent Section clear. With the 8th Brigade Tent Section only three miles away at Annabeh there did not seem much point in keeping Colonel M. at Berfilya, and I knew we should want him badly farther up. So leaving the 8th and 22nd Brigade Tent Sections at Annabeh and Ramleh respectively I arranged that Colonel M. should leave his sand carts at Annabeh with the 8th Brigade Field Ambulance and come up with his limbers to Beit-el-Tahta to open a divisional collecting station there. Leaving the camels in charge of a serjeant with orders to come back to Foka as soon as they were fed, I rode off with my groom about 10 o'clock and got back to Foka in the early afternoon. The division had had two quiet days without any casualties to speak of, and as the camel cacolets turned up before dusk, and rations were now plentiful, the crisis was over for the moment.

November 24.—This was an idle day and in the afternoon my servant, Private B., turned up at Foka on his donkey: our transport and baggage had arrived at Latron and he had thoughtfully abstracted a shirt from my valise, so I had a wash and change. I was down to my last pipe of tobacco in the afternoon when the post arrived with a providential tin of Capstan from Eily, so altogether I felt in good cheer.

The horses of the Division were all sent back to Ramleh to-day as they were only an encumbrance to the squadrons in line, but we kept ours at Divisional Headquarters.

(To be continued.)

THE RELATIVE IMPORTANCE OF MAN AND BEAST IN HUMAN TRYPANOSOMIASIS.¹

By WILLIAM H. DYE, M.R.C.S., L.R.C.P., D.T.M. AND H., L.D.S.

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LABORATORY experiments on animals do not necessarily indicate the usual course of events taken in the spread of trypanosomiasis, and, as the high mortality of the disease prevents experiments on the human subject, recourse must be had to field observations, when conditions are favourable, to obtain a guide as to the relative importance of man and beast in the spread of sleeping sickness.

The author had under observation for some twenty-two months a small outbreak of this infection which, owing to its limited scope and the fact that the inhabitants were not allowed to leave the area, gave certain opportunities for observation. This outbreak took the form of a small local epidemic, or "flare-up," in a much larger endemic area in the south-eastern part of Tanganyika Territory, where sleeping sickness appears to have existed for some considerable time.

The trypanosome responsible was held to be *Trypanosoma rhodesiense*, since the common species of tsetse fly was *Glossina morsitans*, and posterior nucleated forms were found in experimentally infected rats. *G. pallidipes* and *G. brevipalpis* were, however, occasionally found, the latter limited to a very small area.

PAST HISTORY OF THE OUTBREAK.

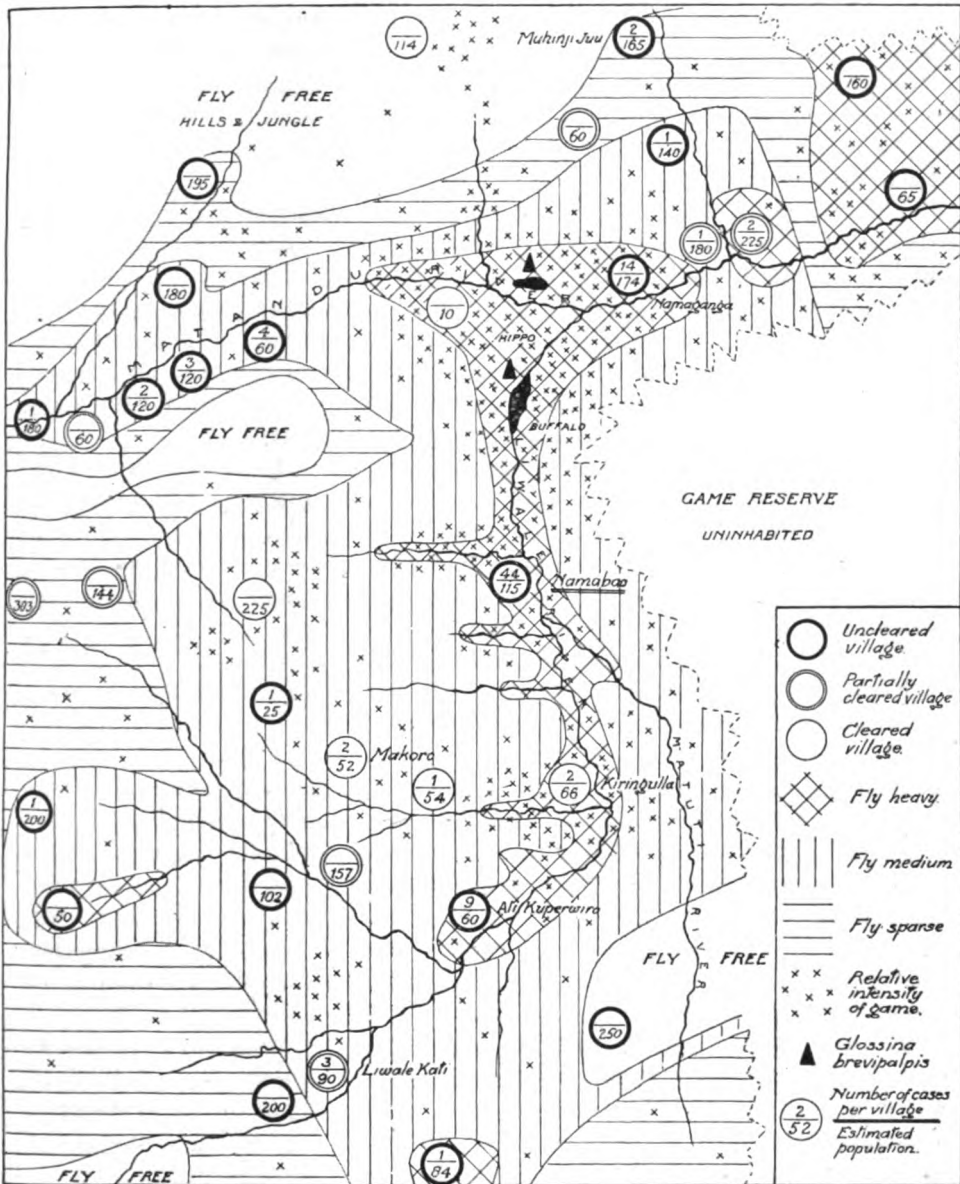
Although native information is notoriously untrustworthy, the following is of interest and probably correct.

In the memory of the older inhabitants, the Liwale River valley, and the adjacent part of the Matandu River close to its junction with the former (map 1), had a sinister reputation.

Villages built there had sooner or later to be abandoned owing to sickness, which ceased when the inhabitants took up new sites at a distance. On the other hand, it would seem that individuals living by themselves, or in two- and three-men villages, escaped. As, however, the valleys possess good soil and water, in a dry and unprofitable area, the inhabitants usually made attempts to return, although certain sites, favourable in themselves, had become definitely banned. The deaths were naturally credited to malign influence, but that sleeping sickness has been well known is evidenced by its possessing a local name, it being, in its early stages, not inappropriately called the "swelling disease."

¹ My thanks are due to the Hon. the Director of Medical Services, Tanganyika Territory, for permission to publish this paper.

In December, 1924, sleeping sickness appeared in the village of Namabao (map 1), and by March, 1925, forty-two deaths had occurred,



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whose death-rates did not show any marked excess over that normal for the rainy season. A close study of these villages revealed certain suggestive facts.

Namabao itself has stood for two and a half years in a heavy fly area with a bad reputation, and examination of the tax registers for this period shows no abnormal death-rate. It had, that is, remained for a considerable period free from the disease, although occupying a bad site. The village consisted roughly of two groups of houses. There was no attempt to clear the bush, which grew up to and between the houses, and was, naturally, swarming with fly.

The village of Kiringulla, about ten miles further south, had been in existence for a number of years, and was on a favourable site, raised above the level of the river vlei, and surrounded by its gardens. Also, owing to the length of time the village had been in existence, the houses were comparatively clear of bush, which had been cut for firewood. The surrounding bush was, however, as heavily infested with fly as was the case in the other village. It will be noticed that this village escaped to a very great extent, and previously had had a very long immune period.

About ten miles further south lies another village, Ali Kuperwiro, which had been in existence for two and a half years, and was a duplicate of Namabao, being quite uncleared and swarming with fly.

The condition of the remaining villages, whether cleared or uncleared (and therefore fly infested or otherwise), together with other details, is shown on map 1.

The chief points of interest are as follows:—

Firstly, the exemption from disease of Kiringulla (where only two cases were found) although it is situated midway between two badly-infected villages. The general fly and game distribution of all three is equal, but the central village has no fly actually in and among the huts. The two cases found may have become infected while visiting adjacent villages.

Secondly, in the case of Namabao, there was undoubtedly a period of about two and a half years during which it was free from the disease, although all conditions of fly, game, etc., must have been as they were later, and sleeping sickness was present in this part of Tanganyika Territory. This is highly suggestive of the introduction of an infective agent about two and a half years after occupation of the village site.

Thirdly (map 1), the number of cases per individual village appears to depend on the freedom or otherwise from fly of the village, the distribution of fly in the surrounding bush having no influence on the sickness-rate. It must be remembered that odd cases in the fly-free villages may have become infected while visiting the chief focus of infection.

The figures shown are composite figures for December, 1924, and the twelve months of 1925, and have been carefully checked. Occasional natives were unaccounted for, and may have run away or died, but their numbers were too small to affect the general distribution. Only one case

(Case No. 214, to be dealt with later) occurred during the first ten months of 1926 in this area.

Now the natives are very fond of visiting other villages and are constantly moving about the bush seeking roots, leaves, honey, etc., to supplement their very meagre diet, and to obtain wood and bark for house-building. The inhabitants of all villages are therefore equally exposed to the bites of the tsetse in the bush, but not to those of flies haunting the villages.

The distribution described leads then to the belief that, whatever the original cause of the outbreak, it spreads from man to man and not from game to man, and that the tsetse flies responsible were those in the villages and not those in the bush. No livestock, other than chickens, is kept by these people.

Many individual cases were investigated in detail in the attempt to determine the mode of infection, but the vast majority had to be discarded, since too many fallacies existed to make them of any scientific value. The following facts can, however, be vouched for from personal observation.

(1) *The Namabao Experiment*.—As the whole of the inhabitants, both sick and well, had been removed from their village and segregated in a fly-free area, it was deemed permissible to carry out the following test. The survivors were very anxious to return to salvage what was possible of their crops, so, following a two months' detention period during which time it was possible to draw conclusions as to their complete freedom or otherwise from infection, the healthy natives were allowed to go back. I followed them down to their village a few days after. As it was the end of the rainy season, the village, bad originally, had deteriorated. All paths were much overgrown, and bush was very evident between and about the huts. Spoor of game of all sorts lay everywhere, and elephants had pushed off roofs in search of food. The presence of fly could not be ignored.

Now, of these survivors, who had been carefully examined before being given permission to return, not one developed sleeping sickness during the period under observation (twenty months), although they remained in the village for two and a half months, and after that went to and fro for another month and a half before finally settling in their new allotted site. In explanation it is natural to suppose that, during the two months that the village remained uninhabited, the fly responsible for the previous cases had either succumbed or moved off on the game that had roamed about the village, and that a new fly population had come into being.

Although all natural conditions had altered much for the worse, and the proximity of game exceeded anything that would occur in the normal course of village life, none of the returning natives contracted the disease. *In other words, by removing the human source of infection the site again became healthy and safe for habitation.*

(2) *Cases Nos. 174 and 181 of Makoro*.—The village of Makoro is situated in an open site, well cleared of bush, and one in which fly was not

observed. It had only two cases of sleeping sickness, mother and daughter. The latter was one of three wives of a native of Namaganga, which village was badly infected and heavily infested by fly. One of the Namaganga wives developed symptoms of sleeping sickness in July, being discovered on July 30, 1925. The wife at Makoro developed the disease in early August, being sent in on August 8. Her mother, who came in to look after her, was also found to harbour trypanosomes in her blood. Later, the third wife, living at Namaganga, developed the disease in early October.

The sequence of events is presumed to be as follows. The wife living in Namaganga contracted the disease, which, owing to the number of cases that had occurred and the amount of fly in this uncleared village, would be relatively easy. The second wife, living at Makoro, was accustomed to visit her husband in Namaganga at frequent intervals to bring in her share of the produce. She was often accompanied by her mother. Here she would be bitten by many local flies inhabiting the bush surrounding the hut, and some of which would hold trypanosomes obtained from the first wife, or others. Her mother would run a similar risk. Moreover, although the two infected women were living at Makoro with trypanosomes in their blood, no other cases occurred in that village, which was free from fly although there were considerable numbers in the bush round it.

The logical conclusion to be drawn from this case appears to be that infection was definitely from man to man carried by local village tsetse flies.

(3) *Cases Nos. 70 and 197 of Liwale Kati.*—Only three cases of sleeping sickness occurred in this village. The first died in April, 1925, and no details are available. The second was discovered in June, 1925, was removed, treated, and eventually allowed to return to his village. He was found to have relapsed and to be *in extremis* in November, 1925. The villagers were carefully examined and only one further case found. This was the brother of the sick man and occupied the same house, being apparently an early case. On his removal no further cases occurred. The village was a partially cleared one, but fly was found in places, one constant spot being the neighbourhood of this house. This again is very suggestive of direct cyclical transmission.

(4) *Cases Nos. 27, 214, and 232 of Muhinji Juu.*—Case No. 27, an inhabitant of Kiringulla, was admitted in May, 1925, treated with "Bayer 205" and allowed to return. He failed to report and disappeared, being eventually reported as having died in the village of Muhinji Juu in November, 1925. On January 21, 1926, another man was found suffering from sleeping sickness in this previously clean village. He was stated not to have been outside his village for the previous six months, a statement which, as investigation showed, was probably accurate. He was removed, treated, and remaining fit for some time, allowed to return to his home, coming in for periodical inspection. On reporting in October, 1926, he was found to have relapsed, with parasites in his blood, and was again admitted. In late December of the same year a further case, from an adjacent house, was discovered, having been sick for two or three weeks.

The sequence of events points to direct man-to-man infection. The disease was introduced by a sick visitor who, having been treated with "Bayer 205," would not have trypanosomes in his peripheral blood until possibly one month before death. This interval would, however, give ample time for infection of local fly. Following his infective period, a second case was found, removed, treated, and allowed to return. He relapsed nine months later and again became infective, two and a half months after which a third native was found infected.

This village was a particularly happy one for purposes of investigation as, while quite uncleared, it was extremely scattered, each group of one, two, or three huts forming a small commune. All three cases occurred in one such commune. If they had appeared together or at scattered intervals, the proximity of infected animals might have been argued, although the immunity of the rest of the people might question this. But the definite intervals corresponding to the infection period of the previous man suggest a most definite relationship. As before mentioned, there is no live-stock kept in these villages which could act as a possible local reservoir.

THE 1926-1927 RECRUDESCENCE.

While, during the first ten months of 1926, this local area remained clean with the exception of the one case mentioned above, in November and December of 1926, and the early months of 1927, two small but very interesting recrudescences of the disease took place.

By this time the adjacent countryside was intimately known, and the inhabitants had been listed. As the quarantine was still in force, it was possible to check, accurately and periodically, all the inhabitants, and the following account and figures can be taken as definitely indicative of what took place. *These cases and no others occurred.*

Map 2 shows the distribution of the Muhungu outbreak. It will be noted that two previously treated cases (marked on this map as "relapsed") who had shown no signs of disease for some months and had been allowed to return to their homes, relapsed with parasites in their blood. The dates on which the parasites were first found again are shown against them. The course the disease took in these two natives made it certain that they were relapses and not fresh infections, for experience has made it comparatively easy to differentiate the two conditions. The figures in brackets against each of the fresh cases denote the probable order in which they became infected, taking into account their signs and in some cases the history. But with an unknown incubation period this order is naturally guesswork, and stress is not laid upon it. The unbracketed figures represent the Case Ledger Nos., and show the order in which they were discovered. The period of occurrence extended from November, 1926, to April, 1927, but the majority developed symptoms in January and February.

The following points should be noted :—

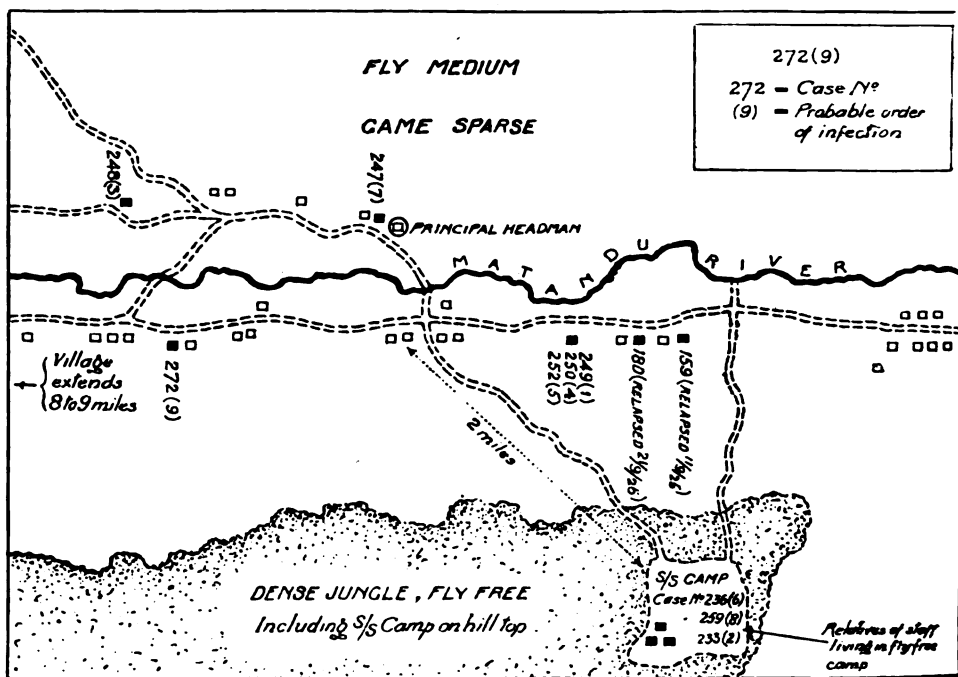
190 Importance of Man and Beast in Human Trypanosomiasis

(a) The limited area involved, adjacent to the houses where the two relapsed cases had lived; the limited spread; and the large area which remained unaffected, although conditions all along the river are very similar.

(b) The three cases in one family. Case No. 249, wife; Case No. 250, child of about four years; and Case No. 252, husband.

(c) Cases Nos. 236 and 347 had no symptoms but were found on blood examination.

(d) Of the cases marked as occurring in the fly-free sleeping sickness camp, two were wives and one a child of the native staff. They admitted



MAP 2.

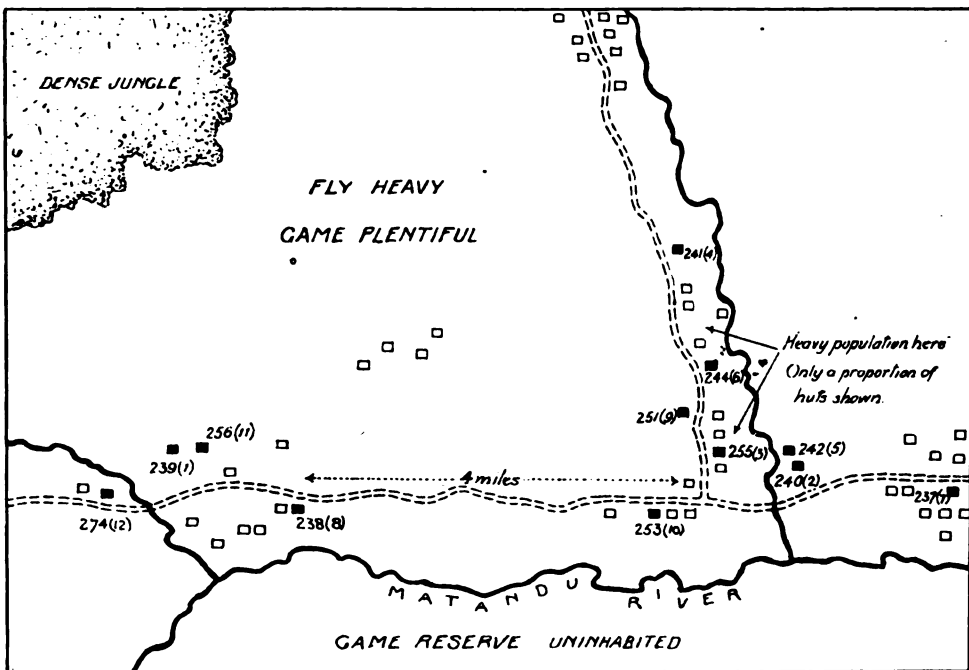
visiting the infected part of the adjacent village about three-quarters of an hour away, the seat of the local Akida, where there is a native store, but indignantly repudiated the suggestion that they had been into the bush, as being wives of natives on good pay they possess servants to do these menial tasks. This is in all probability true. Further comment on this small outbreak is unnecessary.

During the same period another group of cases occurred. The interesting distribution is shown on map 3. The origin of this group was not so definite, but two relapsing cases that had disappeared were known to have died hidden in this village, although the actual houses occupied were doubtful owing to the native fear of punishment. All details are given and no further comment is required.

In both groups it appears difficult to associate the distribution with any but man-to-man infection, the spread being such as would be expected in any ordinary infectious disease of moderate virulence.

THE PROBABLE COURSE OF EVENTS.

The ingenuity of the African negro in giving false information, either intentionally or through stupidity, usually makes the gathering of data, accurate enough for scientific purposes, a matter of impossibility. But, by keeping attention focused on a small controlled area, it was possible to obtain certain definite and uncontrovertible facts and figures. The two



MAP 3

small recrudescences, while unfortunate in themselves, were extremely useful for observation, occurring as they did at the end of a quarantine period, and in close proximity to the headquarters camp. The opportunity for close study and careful checking of individual small outbreaks does not always occur, so that the above description may be of interest and use in helping to decide the question of the necessity or existence of an animal reservoir in the case of *T. rhodesiense* infection. While it would be unwise to dogmatize from the above facts, it is suggested that in the case of *T. rhodesiense* the course of events is as follows:—

The vulnerability, or otherwise, of a native to sleeping sickness depends on whether he inhabits, or stays in, a fly-infested village—the condition of the surrounding bush country, except in certain circumstances to be men-

tioned later, not having any bearing on the matter. A village badly infested by fly can remain healthy for an indefinite period until an infected native arrives, either in the course of his travels, or, as is commonly the case, for a change of air when sick. It is well known that trypanosomes can be present for some time before symptoms appear. I have myself kept for a full month in a fly-free camp a native harbouring parasites, and during that time he has continued in the most robust health, with no symptoms of disease whatever. A native in this condition, or even a sick native who is still able to get about and has not yet retired permanently to the interior of his hut, can daily infect numbers of village tsetse flies.

It has been shown that the tsetse flies are fond of remaining about game paths if the supply of food is constant, but when the game scatters in the rainy season they also disperse. Now a badly cleared village would act as an ideal game path at all times of the year, and, although many flies would be carried into the bush by the natives and many succumb before the cyclical period had elapsed, yet, where large numbers are present, sufficient would remain to infect other men. As soon as a second native had become infected a dual supply of parasites would be available for some time. An incubation period of two or three months appears probable and rather constant in this part of Africa. Some of these freshly infected natives would travel, and the disease would be spread if the type of village visited was favourable. Unless the whole area consisted of badly fly-infested villages, the disease would eventually die down, reappearing at a distance where circumstances were favourable, and being carried on in this way from year to year.

It might be argued that the paths leading from one village to another might act as a source of infection. This may be possible in certain circumstances, but in this particular part of Africa villages are some distance apart, and paths, although frequently used, are not so constantly occupied by man as to encourage the fly to remain on them permanently. It has been noticed how patchy the fly distribution is on these paths, and how these vary from day to day. Communal water holes and fishing sites, where they exist, or any bush site where the natives daily congregate or work, would act in a way similar to the fly-infested village. They are not of much importance here, a circumstance which has helped to keep the investigation clear of side tracks, but they are probably of much importance in other sleeping sickness areas.

Sleeping sickness of the *T. rhodesiense* type seems to be an infectious disease, spreading only slowly unless circumstances happen to be favourable. Unfortunately they often are, but it should be possible, if the above reasoning is correct, to break the connection between man, fly, and the trypanosome. It would serve no useful purpose to discuss the various theories as to how wild animals act as reservoirs. The observations here recorded point to man as being much more dangerous to man than is any species of game.

It is not proposed to discuss the question of natural or acquired immunity to the disease, but certain experiments, unfortunately inconclusive, lead to the supposition that immunity probably occurs. But undoubtedly, once infection has advanced to the stage that trypanosomes are easily found in the peripheral blood, the disease, without treatment, runs a fatal course.

PREVENTIVE MEASURES.

The writer was very much impressed by the ease with which the spread of the disease could be controlled by the simple expedient of removing the human source of infection, when, as in these cases, this was completely possible. Bush clearing in the vicinity of villages was immediately instituted, but this is a long process and, until the time comes to burn the cut vegetation, can have little or no effect. This was emphasized by the reappearance of the disease in these circumstances whenever a fresh source of infection (a native relapsing after treatment) was present.

It is suggested that failure to eradicate the disease is due to the fact that over any extensive area it is a matter of extreme difficulty to remove the source of infection in anything like its entirety. Over the larger area involved, it was found that to all appearance the disease existed as single, widely placed, sporadic cases. But from investigations in the local area it seemed unlikely that this was true, and on the institution of weekly death returns per village, and the employment of two well-trained native inspectors on investigation work, it was found that each so-called sporadic case was merely one of a group. Small groups were found that would have remained for ever undiscovered but for noting a suspicious, if only slight, increase in the mortality returns for a given group of villages. A study of the tax registers for the past years (by plotting out deaths per village) showed that small groups of higher mortality had been occurring for some years. As sleeping sickness was known to have existed during that period, it is highly probable that some at least of these deaths were due to the disease.

As previously mentioned, sleeping sickness of the *T. rhodesiense* type here, and probably in most parts of Africa, is usually an infectious disease, spreading only slowly and, except in favourable circumstances, not giving rise to epidemics. Using the terms in their loosest sense, epidemic is more spectacular but less dangerous than endemic infection, for steps are usually taken to deal with the former and not with the latter. If it is possible to deal radically with a local epidemic, or "flare-up," by simple measures, an extension of these measures on a suitable scale should suffice for a greater area.

It goes without saying that measures against the tsetse fly, either local in villages or on an extensive scale for a whole countryside, are of great value. But in the area under report (which is but a duplicate of many parts of Africa where *G. morsitans* abounds) complete destruction, or even marked diminution, of the fly is a matter of great difficulty if not at present

impossible. Only in certain selected sites is this proposal of practical value. Moreover, the depopulation of large areas, as sometimes practised, seems a very wasteful method.

Here, as is so often the case, the country consists of large areas containing masses of dense jungle, either in clumps or extending unbroken for miles, the edges of which afford excellent cover for the fly during the annual fires. The original clearing of any one patch would require the labour of many thousands of men. Also, this type of bush is destroyed neither by "ringing" nor burning, and grows again rapidly, the last state, unless the cutting is done yearly, being worse than the first. Again, there are vleys where, owing to the subsoil water the grass, in a year of good rains, will not burn. It is therefore necessary, from a practical point of view, to limit activities against the fly to the neighbourhood of villages and other bush sites daily used by the natives, where clearing can be an annual event. This, if the above observations are correct, would appear sufficient for sleeping sickness purposes.

But main reliance must be placed, as in other infectious diseases, on constant and rapid removal of the human source of infection. A European medical officer cannot, in average parts of Africa, travel through a district and find any but a small proportion of existing cases, for, apart from the difficulty of visiting every village at frequent intervals, natives have a great dislike to being removed from their homes and confined to a virtual prison, however comfortable the latter may be made. In this they have much in common with the rest of humanity. Treatment is not yet so successful as to attract them on this account. Accordingly many cases are concealed. It is these undiscovered cases that carry on the disease from year to year, and give rise to the impression that an animal reservoir is necessary. The solution lies in the employment of a staff of specially trained and carefully chosen native inspectors, for the constant patrol of areas of reasonable size; not more than twenty villages being allotted to each man, the actual number depending on their size and situation. In twelve months an intelligent native of the proper type, who is well supervised, should know his district and its inhabitants so thoroughly that concealment of sick should be impossible. These men could also supervise the clearing of villages and other sites frequented by natives. This is only possible where an intimate knowledge of individual villages exists.

The impracticability of removing contacts, and the multiplicity of small difficulties always met with in dealing with large numbers of primitive people, would prevent the immediate disappearance of the disease, but in the course of not more than two to three years the necessary link in the chain should be broken. In other words, the amount of infective blood available to the fly would be so small that further infection would be impossible. Once the infected areas were well patrolled, such ordinary administrative measures as the compulsory notification of sickness (measures which would be instituted for any other infectious disease) could

be made practical. With this disease notification of sickness lasting for ten days or more would suffice. In addition, it is essential that all cases of sleeping sickness should be segregated in a central camp for at least twelve, and possibly eighteen, months, to obviate the danger of the relapsed case. At the end of this period, if the native survives, definite cure can be supposed. The chances of success with the drugs at present at our disposal would seem, from results obtained, to be greatly increased by continuous systematic specific drug treatment, carried on over a considerable period.

In a country as large and varied as East Africa, to lay down any hard and fast laws as a panacea for any disease is always dangerous. But a definite line of action is useful, if reasonable indications exist. And after a close study of the course of events in a local limited area, the above suggestions would appear to constitute a rational, and not too expensive, method of combating the disease, the harmful potentialities of which are daily evident.

SOME RANDOM JOTTINGS ON THE TRAINING OF OTHER RANKS OF THE ROYAL ARMY MEDICAL CORPS.

BY LIEUTENANT-COLONEL G. A. K. H. REED.

Royal Army Medical Corps.

A.—LECTURES ON ELEMENTARY ANATOMY, PHYSIOLOGY AND FIRST AID, ETC.

It is thought that some of the following remarks and tips may be of interest to those of our junior officers who may be called upon to lecture on these subjects to classes of instruction and also may aid candidates.

The subjects, on account of their very elementary scope, are not very interesting to the lecturer, and one has often noticed that this not unnatural want of enthusiasm is often communicated to the class with unsatisfactory results.

"Teaching," in its widest term, is, however, a not uninteresting subject to some of us and is by no means an easy task, especially as the lecturer is often handicapped by want of "subjects" and "objects" on which he can demonstrate, and also often by the inability of the lecturer to place himself in the candidate's position. His own knowledge on the subjects in question has been gradually assimilated in many years' study, but his task is to give a working, if elementary, knowledge to men whose previous education has been limited and who naturally become confused when suddenly confronted with technicalities in an almost unknown language.

The first thing to bear in mind is that the memory and understanding are better trained through the eye than through the ear—every point must be demonstrated. Under the conditions usually obtaining the unfortunate candidate for a First Aid and Nursing Certificate is obliged to commit to memory pages of our "Royal Army Medical Corps Training," often without really understanding or visualizing the subject matter. This is due to want of demonstrable subjects—lack of illustrations and models, and very often to the short time the lecturer can devote to the subject "in addition to his other duties."

Again, some of our officers, no matter how highly skilled themselves, are not good at imparting elementary knowledge, and one has often met officers who confessed that they were quite incapable of lecturing on the simplest subject. This leads to a perfunctory reading of the "Royal Army Medical Corps Training" to the class, with perhaps a little elaboration, which makes a dry lecture. Interest must be kept up at all costs, and the class kept on the *qui vive* by having matters put to them from an unusual angle. The habit of simply learning the manual by heart without real understanding would then be eliminated to a certain extent. The manual

is, after all, only an outline and every word must be understood. While on the subject of our "Training Manual," I should like to make a plea for more and yet more illustrations, i.e., to train the eye. The method of describing details in that most excellent book is also not uniform and makes it difficult for the learner who has had no previous training or knowledge in technical subjects. The definitions of medical conditions are a case in point. Ask any partly trained man — a recruit who has just left the depot, or an orderly (Royal Army Medical Corps or Regimental)—a question put from an unusual angle, and note the result! Ask him, for instance, the course of the circulation, only starting from the main aorta instead of the right auricle, and you will find he will become confused because he has learnt the matter off by heart without visualizing the subject or understanding it.

An Irish recruit, who had done very well in his *viva*, on passing out of our training depot was asked why the brachial artery was so called, and answered, "Because it is ready to break at any moment!" This is a fact.

Ask a candidate, "Have you ever seen cartilage?" or "Have you ever eaten a muscle?" he will reply "no" to both questions in eighty per cent of cases!

Tell him that a muscle is meat, and draw a sketch of a joint of beef or a mutton chop or any other household variety of muscle, and he will at once realize what muscle is. Ask him if he has ever seen a round, white, shining structure, something like a golf ball, in the meat at the cut end of a leg of beef, or has he ever eaten meat, and he will answer "yes"—he has not understood previously what muscle was, even after many lectures—and small blame to him.

Again, draw a diagram of a mutton chop and point out its constituents, he will then realize more about vertebræ, the spinal cord, muscles, bones, periosteum and pleura than he ever did before. Not much extra time is taken up this way, and it is time well spent and often saved as frequent revision is unnecessary.

One must of course bear constantly in mind that anatomy is not the end but the means in training the candidate to an efficient knowledge of first aid and nursing, and anatomical matter outside this scope must be repressed or only mentioned occasionally to excite interest. The necessary crude sketches which are so essential to teaching the subject are not beyond the scope of any one able to write.

The supply of charts should be made much larger, and one raises a plea for the purchasing of anatomical models of the "take-to-pieces" variety to be kept in some central spot, such as Company Headquarters, and loaned to detachments as required.

I, personally, made a practice of "demonstrating" all ration joints to classes of instruction; bullock's hearts, sheep's brains and similar offal can usually be obtained, and the showing of these incites keenness to a very

remarkable extent, and in this way the candidate (very often for the first time) sees and understands what he has been hearing and reading about.

The use of the human model (in warm weather only) is also often lost sight of. The tip, "if in doubt about a question in surface anatomy try it on yourself," is often neglected. Ask a man which is in front, the trachea or œsophagus? In fifty per cent of cases he will not know, although his own cartilaginous trachea is within a foot of his fingers.

When lecturing on "joints," have a knee from the day's beef ration opened up, and *show* its components; something more than the formula, "two or more bones, cartilage, ligaments, synovial membrane and synovial fluid," will then remain in the mind of the student and, at any rate, he will never forget the formula and leave part of it out under the stress of examination. He has *seen* things. Word pictures or references to common objects also help. "Water is pumped into a cistern, but flows out quietly if the cock is opened," at the same time will explain why the pulse is not felt normally in veins.

Another difficulty experienced by candidates is the committing to memory definitions of medical conditions—a frequent question in examination papers. The candidate unused to a technical vocabulary is often unable to put his thoughts into words, even if he really knows the answers to a question. He is not helped much by the definitions in "Royal Army Medical Corps Training," which do not follow any common plan, but are inclined to be diffuse.

How often are "apoplexy" and "epilepsy" confused, yet the letters "pop" in the former term give a ready means of remembering—an artery goes "pop" in the brain!

One has been in the habit of giving a uniform skeleton definition, the blanks of which may be readily filled up—"(*so and so*) is a condition caused by (*so and so*) and showing the following symptoms . . ."

One does not pretend that the above is very scientific, but it is easier to remember, and at least as accurate as those shown in our "Training." Another tip for remembering lists of symptoms, which may be fitted into the above skeleton, or used for other purposes, such as in "case taking" and observation of patients, is: "Appearance and position, temperature chart and history." Appearance and position covers everything which can be noticed by the naked eye, commencing at the top of the head and ending at the soles of the feet, e.g., colour, expression, movements, position, etc. The words "temperature chart" form a ready means of remembering everything shown on a temperature chart, i.e., relating to temperature, pulse, respiration, urine, motions. The word "history" means (*a*) history of present attack; (*b*) history of previous attacks of the same disease; (*c*) history of other diseases bearing on the present disease; (*d*) family history. Again I lay no claim to anything scientific, but simply to grouping facts in a way which can be easily remembered.

Routine lectures on shock, loss of consciousness and fits, etc., are

generally dull as given, but it is possible to stimulate the interest of a class. Announce the text of your lecture as follows: "You are walking down High Street, Aldershot (or the Mall, Mhow, Central India!) and you see a man lying on the ground surrounded by a crowd—the onlookers, noting that you are in the Royal Army Medical Corps, appeal to you for help, and expect you to take the case in hand—medical help is not immediately obtainable—what will you do?" This at once puts matters on a concrete basis, and gains the attention of the class. In stating the commonest causes of unconsciousness, ask the question: "Have any of you seen a person become unconscious? If so, what made him so?" The knock-out at boxing, a case of fainting, or a drunken man will suggest themselves to the class, their attention is gained, and that is half the battle.

Tips can be given in the above case, such as "open all the clothing; take off collar; put folded coat under head and move back the crowd; while you are doing this, *think* of the probable causes of the condition—the commonest causes first—and keep your eyes and ears open. Get an intelligent man in the crowd to help you and send for assistance."

When lecturing on fractures get a mutton bone and break it; the class will then see one of the varieties of fracture. A few bones, including a half skull, should form part of the "training" loan equipment suggested above. The extra cost would be small and well repaid.

In describing the interior of the cranium and brain the similarity to a walnut in its shell may occur to many, the living membrane of the shell forming prolongations very similar to those of the dura mater.

Numerous instances and demonstrable subjects on the above lines will occur to many, and there is no doubt, judging by results, that this method of lecturing by eye as well as by ear holds the attention, interests the class and gives better results than those usually obtained by the ordinary methods.

B.—SOME REMARKS ON HIGHER TRAINING IN FIRST AID.

As regards "First Aid," there is not much doubt that the general standard of efficiency in this subject among "other ranks" of the Corps is rather low, not so high, for instance, as that of the average St. John's Ambulance or the First Aid Detachment of a large railway district. This should not be.

I submit that a higher standard of efficiency is necessary, especially on active service, as the sorely pressed medical officer would be saved much time in moments of stress if he could depend more on his subordinates to deal with the slighter cases. Under present conditions it is a moot point whether a casualty would not have a better chance if left unaided until he could be brought before a medical officer. A really working knowledge of first aid, including the aseptic application of dressings, is not by any means beyond the powers of our other ranks, and I suggest that the matter

is of sufficient importance to warrant the introduction of a special trade qualification open only to really highly trained men (junior non-commissioned officers and privates).

More detail on this subject, and especially more illustrations, should be embodied in the "Manual," or alternatively a separate pamphlet printed. More diagrams, models and instructional material should be available instead of the usual small number of antediluvian splints with a few bandages.

The scope of a trained man's responsibilities should be carefully demarcated, as otherwise "incidents" may occur.

Instruction in advanced stretcher-bearer drill and tactics and field work might form part of the course, as there is no doubt that an efficient stretcher-bearer must be more than a beast of burden and must know more than the "barrack square" stretcher drill.

Our stretcher drill is, without doubt, obsolete in many ways and requires drastic revision; much unnecessary detail requires to be eliminated and much added before it can be considered practical. For instance, only the shoulder carriage of stretcher is taught. This is a good method if four bearers are available and cover good. In the late war in numerous instances only two bearers were used per stretcher if the carry was short. The "two bearers per stretcher" method is also normal for hospital work and should be taught; the shoulder carriage should be looked upon as a useful expedient on occasions only.

As regards redundant detail, only glance at the method laid down for "supplying stretchers." This would be scrapped at once on Active Service and makes the learning of the drill unnecessarily difficult to recruits. In this particular instance, if the No. 4's position was always on right of No. 1, whether in open or close order, the No. 3 of each squad would only have to turn about to get at the stretcher and all squads could be supplied simultaneously instead of one by one. Imagine a fire drill on the lines of our stretcher drill, the cost of insurance would be very much increased! The above is only given as an instance; there are many others which could easily be quoted. Let us have a practical drill and one that does not require to be immediately scrapped when quickness is necessary!

If an R.A.M.C. Challenge Shield were introduced and inter-company competitions instituted, one thinks that more keenness in this subject would be engendered and the standard raised. This competition might also be open to our Territorial comrades and be on the lines of the Connaught Ambulance Shield Competition, which did so much to foster an interest in first aid and stretcher drill among combatant units.

A DAY IN A LONDON PUBLIC HEALTH DEPARTMENT.

By MR. FRANK SINGLE.

Ex-Staff-Serjt., Royal Army Medical Corps.

HAVE you ever wondered what goes on in a public health department, and what work there can be to justify the existence of medical officers of health, lady doctors, tuberculosis medical officers, borough analysts, a large staff of clerks, sanitary inspectors, health visitors, disinfectors, workmen, etc. ?

Perhaps an easy way of understanding the work of all these people is to be present in imagination when the offices open in the morning and see what goes on. Let us suppose we are in the private room of the medical officer of health when the post is brought in. This is usually at 9 a.m., and in most up-to-date departments the mail is opened, sorted and booked in by the chief clerk with assistance from a junior clerk.

Medical certificates notifying the occurrence of cases of infectious disease, e.g., scarlet fever and diphtheria, and notices received from the Metropolitan Asylums Board reporting cases removed to hospital by their ambulances, are passed immediately to the infectious disease or notifications clerk, who telephones orders to the disinfectors to carry out the necessary disinfection in all the cases where the patient has been removed. This clerk prepares inquiry cards for the outdoor officers (inspectors or health visitors), who visit the homes of the patients and make diligent inquiry with a view to tracing the origin of the disease and preventing its spread.

The letters are rapidly opened, stamped with a date-stamp and sorted under their various headings. Complaints of insanitary conditions and nuisances are entered in a special register, which is required to be kept by law, and the action taken by sanitary inspectors to whom they are passed for attention is later recorded therein. At the next meeting of the Public Health Committee this register will be examined by the chairman and initialled by him, thus ensuring that he, as a representative of the sanitary authority, has satisfied himself that all complaints received have been attended to.

Notices of sanitary works, plans of drainage, etc., are entered in a special register before being issued to the sanitary inspectors.

Letters asking the Council to supply information about municipal houses, asking for applicants' names to be placed upon "waiting lists" of tenants, etc., are referred to the housing clerk or other appropriate officer.

Complaints of adulterated food, unwholesome meat, etc., are handed to the food inspector, who also watches over milk-shops, bake-houses, etc.

Special communications, such as those relating to venereal diseases, are not recorded anywhere as a rule, being treated as highly confidential. In one department, known to the writer, letters asking for information about

clinics are destroyed immediately after being answered in plain envelopes, and no permanent record is kept of disinfection of bedding or clothing in this connexion.

Other correspondence deals with tuberculosis and includes notification certificates, case reports, disinfection requests, arrangements for admission to sanatoria, attendances at the dispensary, etc. These are recorded and passed to the dispensary staff for attention.

All births are now reported to the medical officer of health, and these notices are examined and cases suitable for home visiting by the health visitors, together with other communications relating to maternity and child welfare work, e.g., children needing attention, expectant and nursing mothers wanting help or hospital treatment, applications for milk and food, requests for dental treatment, and many other features of this work among women and children, are all referred to the lady clerks engaged on this section for entry in the various records before being passed to the health visitors for attention.

The medical officer of health arrives while these matters are in progress, and quickly runs through the various documents, which have been placed in appropriate folders. Any special instructions are either given direct to the officer concerned or are pencilled on the documents in question.

Meanwhile the telephone bell rings. Now, it is an irate ratepayer demanding special consideration for his needs; then, it is a councillor wishing to discuss a matter with the Council's medical officer. Perhaps a local doctor 'phones up about an obscure case of illness which he wishes the medical officer of health to see, and so on. Later in the morning the outgoing correspondence, letters dealing with many varied subjects, is brought in for signature; for the ever-widening sphere of activities of the public health departments are bringing them more and more into close contact with the lives of the people at all stages and ages, and at a constantly increasing number of points in their lives do they look for and rely upon the advice and help afforded.

For the first hour and a half or so the outdoor staff are in attendance at the Town Hall to post up diaries, conduct correspondence, interview callers, etc. Sanitary inspectors discuss notices and plans with builders; health visitors interview mothers; and workmen receive orders. Gradually, however, as the outdoor officers go upon their various ways, the department quietens down, and the clerical staff concentrate upon such matters as accounts, statistics, returns, and are constantly interviewing callers, answering telephone calls, etc.

As each succeeding delivery of letters takes place, the procedure already indicated is repeated; urgent business is communicated to the officers concerned and does not wait until their return to the office. In some departments the outdoor officers make a point of returning to the office later in the afternoon; in others they report by telephone and do not come back to the office.

As opportunity offers, the medical officer of health visits the various centres, clinics and other places under his control, and generally "keeps an eye" on the whole of the activities of his department. At some time during the day (it may be after the offices are closed) he discusses with subordinates reports for committees, and arranges the various plans of campaign for combating disease and illness. The public health departments are of necessity becoming more and more sectional as the sphere of their work widens; yet the sections must be harmoniously advanced together, for each is too closely interwoven with the other to be separated. In order to ensure that this shall be achieved, the chief clerk often acts as a "liaison" officer. Usually he is a man who has been an official for many years in the public health service. He keeps his finger on the pulse of each section, and is usually more an administrator than a clerical officer. He is able by his general knowledge and experience to give advice and sound opinions when called upon, and generally acts as private secretary and confidential clerk to his chief.

The activities of all sections of the department have a direct bearing upon its work as a whole. It will be readily understood, for instance, how close is the connexion between maternity and child welfare work, the efforts to secure a pure milk and food supply, and proper housing of the people. Thus, for example, milk or food supply that has been tampered with and overcrowding are bound to produce bad effects upon the mothers and children.

The subject of maternity and child welfare, indeed, affords a good illustration of the intermingling of public health questions, no one of which can be effectually dissociated from the other, and to the most casual observer it must be clear that an improvement in housing, a purer milk and food supply, and better sanitary conditions generally, will aid the efforts made for the well-being of the mothers and children.

The earlier work of sanitary authorities was limited to dealing with environmental conditions, but their activities have been enlarged by recent legislation relating to the personal health of members of the community, and this has brought public health authorities into close contact with the citizens, for to-day even the cleansing of the person in the case of verminous adults or school children is a matter for the attention of these authorities, whereas in earlier days they could not proceed beyond insisting on sanitation in the home.

The medical officers of health have very considerable responsibilities, and apart from the high professional standard demanded of them they are required to carry out administrative duties of great importance. It is questionable whether many members of the general public realize this fact, for only in times of emergency or epidemic—such, for instance, as an outbreak of typhoid fever, food poisoning or small-pox—are the citizens at all conscious of the fact that these officers and their staffs are combating disease, ill-health, and death, on their behalf.

Editorial.

THE MEDICAL DEPARTMENT OF THE UNITED STATES ARMY IN THE WORLD WAR.

SECOND NOTICE.

SANITATION IN THE EXPEDITIONARY FORCE.

THE organization of the Medical Department in the theatre of operations is fully described in Volume VIII of the history. In the volume under review organization is dealt with solely in relation to the prevention of disease in the army. As in the British Army, each commanding officer was responsible to his superior officer for the preservation of the health of the troops under his command, and the ultimate responsibility rested with the commander-in-chief of the forces in the field. It was intended that each commanding officer should have a medical officer to advise him, and the control of these officers and of sanitary matters was at first centralized in a department of the office of the chief surgeon of the American Expeditionary Force. Central control was comparatively easy at first, as the number of troops in France was small, and the force was composed of seasoned men who had recently come from service on the Mexican border and had an efficient sanitary organization.

The largest combatant organization was the division, and each division had its sanitary inspector. In August, 1917, a line of communications (afterwards called the services of supply), divided into territorial sections, was formed. There was a chief surgeon of the line of communications, assisted by a sanitary inspector, and a surgeon with a sanitary inspector for each of the territorial sections. Within the sections there were camps, the larger of them having local sanitary inspectors.

The division of sanitation and inspection in the chief surgeon's office did not function properly until March, 1918, when a chief of the division was appointed, and under him were established a division of inspection, a division of epidemiology, a division of venereal diseases, a division of laboratories, and a division of sick and wounded. The division of epidemiology was also in direct connexion with the division of laboratories and the division of sick and wounded. It also established a liaison with the French Service de Santé at Tours, and with the A.D.M.S. Sanitation of the British Expeditionary Force at Abbeville. The division of laboratories had also a liaison with the French Army Laboratory in Paris, and with the British Laboratory at Abbeville.

The greatest difficulty in preventing disease amongst the troops in the field resulted from the necessity of bringing troops by transports filled to

the utmost capacity in order to place a maximum force in the field at the earliest possible moment. Much of the scarlet fever, measles and diphtheria originated on board ship and spread to organizations in the field, as the troops could not be held long enough at the base to eliminate infected men. In one convoy of 24,488 men there were 4,147 sick and 230 deaths on the voyage alone. The two diseases which caused excessive sick-rates and so affected military operations were epidemic diarrhœa and epidemic influenza. The critical military situation from July 1 to November, 1918, prevented any effective control of these diseases; shipment of troops had to go on and every man had to be sent forward in spite of the epidemic of influenza. Immediately after the operations at Chateau-Thierry in July, 1918, about seventy per cent of the troops suffered from diarrhœal disease, caused by ill-prepared and insufficient food, polluted water, chilling at night and a plague of flies. Following diarrhœal disease, cases of typhoid and paratyphoid developed. Up to the end of February, 1919, there were 1,000 cases chiefly due to the use of polluted water and to the presence of undetected carriers. We are told that everything made for widespread typhoid infection, and there would have been tens of thousands of cases had the troops not been vaccinated.

In the first year of the A.E.F. mumps held the first place as a cause of ineffectiveness. No preventive measures applicable under the existing conditions appeared to have any definite effect in controlling the disease. Exposure to infection appeared to be universal, and all men not immune developed the disease.

Diphtheria appeared in epidemic form in only a few divisions, and was easily controlled by the laboratory facilities for the diagnosis of early cases and the detection of carriers.

The American soldiers entirely escaped "trench foot" and "trench nephritis," owing to the front-line troops being mainly engaged in open warfare during the autumn months of 1918; they were not exposed for long periods to the trench conditions which existed in Flanders. "Trench fever" also did not appear, because of the climatic conditions, and not because the troops were in a more cleanly state than in the B.E.F. Trench mouth developed in numbers of the men owing to the neglect of oral hygiene. The A.E.F. was free from tetanus, partly because of the cleaner character of the ground over which the troops fought, and partly because of the prompt and universal use of tetanus antitoxin. Gas gangrene developed in but a small fraction of the wounded men.

One of the most important lessons taught by the World War was the necessity for close co-ordination between sanitary supervision and laboratory service. Epidemiological work in the tracing of communicable diseases to their sources formed a connecting link between these two services. With this object in view a subdivision of infectious diseases, a branch of the division of laboratories and infectious diseases, was established, so that there might be a definite administrative link between sanitary field work

and the laboratory service. This subdivision was not to become in any sense a research organization; its primary purpose was to discover foci of infection, trace them to their sources and suppress the spread of disease before it assumed epidemic proportions.

The officer responsible for sanitation in a division was the sanitary inspector; he was assisted by two officers—one the divisional laboratory officer, who had a simple laboratory equipped for clinical pathology, the other was the divisional water officer, who supervised the chlorination of water supplies for the division. Laboratory examinations of the waters were not made, as it was not feasible to supply a laboratory sufficiently equipped for this purpose.

In the case of an outbreak of infectious disease in a division, the chief surgeon applied to the director of laboratories for assistance, and trained personnel and mobile laboratories constructed and equipped on the same design as those in our armies were sent to the division.

When the American troops were concentrated in bases and training areas, it was possible to exercise a more or less central supervision, but when the troops entered the front line decentralization became necessary and sanitary control was organized on an army basis. In these circumstances the office of the director of infectious diseases and laboratories assumed advisory functions rather than actively taking part in the solution of sanitary problems. An army area was divided into three sanitary sections, and each section had eight or twelve subareas in which sanitary squads were employed. During active operations it was considered wise to exclude from the above organization a strip of territory about four kilometres deep immediately behind the trench lines. In this area, subject to shell fire, any sanitary work of a permanent nature was very difficult, and the divisional authorities provided all that was possible.

In France temporary "barracks" were constructed for one-third of the force, the other two-thirds were either billeted or provided for in bivouacs.

The Adrian "barrack" was selected as the type of hut, because it was demountable, could be made anywhere and the sections put together wherever desired. In calculating the number of barracks required, one linear foot (twenty square feet) was allowed per enlisted man.

In January, 1918, the French accorded to the American Expeditionary Forces the same right to quarter and billet troops as was exercised, under the French laws, by the French army. Empty buildings were generally used and troops were rarely billeted on families. The chief surgeon urged that twenty square feet of floor space in barracks and billets was insufficient, and in November, 1918, forty square feet were allowed, and wherever this was provided there was a low sick-rate.

The experience of American troops with trenches was relatively limited, and the trenches in which they served had usually been provided by the French or British.

During the spring and summer of 1918 the condition of more or less

open warfare prevented the construction of deep dug-outs or concrete shelters—existing dug-outs and shelters were used where possible, but in many sectors the troops had to improvise shelter by digging shallow excavations to accommodate one man when lying down, which when covered with brush gave a certain amount of protection against the weather. When the lines became stabilized for a short time, salvaged material such as scraps of corrugated iron and timber were used to construct semi-permanent camps.

It is generally agreed that a soldier should not carry more than one-third of his body-weight if he is to maintain considerable freedom of action. The mean weight of the American soldiers on demobilization was 144 pounds, and it follows, therefore, that the soldier's burden should not exceed fifty pounds. Actually, the men were expected to march and go into battle carrying a weight which varied from eighty to ninety pounds. Reports as to the effects of these weights are very meagre. Motor transport was largely used to convey the troops from one section to another, and it was the exception for troops to make a long march and then go into battle. The men considered the load excessive, and on the march were prone to discard parts of their equipment, notably the shelter-tent equipment, blanket, underwear, and heavy wire cutters.

In 1917 woollen breeches and a canvas legging were issued for both mounted and dismounted troops, but in 1918 a board of officers recommended the issue of trousers and puttees, and later on the manufacture of breeches for infantry was abandoned.

The shoe (boot) issued in 1916 and 1917 to the American troops proved unsatisfactory; its life was short and it did not keep out water. In 1918 a new shoe, called the Pershing shoe, was issued; it had a three-layer sole, on the English pattern, kept out water and proved durable. The shoe was found to be waterproof, no matter whether constructed of bark-tanned leather or chrome retanned leather. Men of the A.E.F. in the field habitually wore two pairs of woollen socks, which necessitated wearing "oversized" shoes. Company officers, when selecting shoes for their men, frequently forgot this practice, and a good deal of foot soreness resulted. English boots did not suit American troops, and wrinkles formed at the back causing abrasion of the tendo Achillis. The men of the 42nd Division were equipped with English boots on the march to the Rhine, and much foot trouble resulted at the end of each day's march.

A good deal of fleece-lined underclothing was issued, and it was found that men wearing this underclothing caught cold more frequently than did men wearing any other kind of underclothing.

The washing of clothes for the troops presented considerable difficulties, and it was decided to have a mobile laundry for each division. A type was designed and manufactured, as far as possible, in the United States. It was thought that the laundry should be placed close to the baths, so as to diminish the carriage of clean and soiled clothing as much as possible. In the first corps the laundries were in the corps area, but the corps

commander thought they should be under army control, and the army commander considered the best place for them would be at divisional rail-heads.

The ration supplied to the A.E.F. was based on the garrison ration prescribed by Army Regulations, 1913, but varied to meet the requirements of the troops in England and in France. Owing to the inexperience of the cooks the soldier did not receive the full ration value, hence the allowances always exceeded those of the allied armies, "because of the necessity of providing variety in order to assure happiness and to maintain morale." The changes made in the garrison ration were chiefly in the direction of variety by making alternative issues of cheese in the meat ration, increasing the quantity of milk and of jam and its substitutes, making an issue of macaroni and rice and of candy. There was a special craving for sweets among troops in the field. Bread was also issued to front-line troops instead of flour. The original garrison ration had a calorie value of 4706, but the ration actually issued in 1917 to the A.E.F. had only a value of 4109. The rations issued in 1918 and 1919 had a calorie value of 4303 and 4344 respectively.

Soon after the arrival of the first American contingent in France, the necessity of having a water-supply service was brought home to the authorities, and in response to a telegram from General Pershing, the War Department organized a special service regiment, the Twenty-sixth Engineers, for water-supply work with the expeditionary force. The special spheres of the corps of engineers and the Medical Department in the control of water-supply schemes at once came to the fore, and it was decided that the engineers were responsible in army zones for the supply of water in adequate amounts at water points located as near the troops as conditions permitted; they were also required to purify the water by filtration or "disinfection." The Medical Department was made "responsible for any disinfection treatment the water required beyond water points as well as for the supervision of the handling of the water and of the water containers to prevent contamination."

The water-supply service of an army consisted of army engineer troops (not to exceed one headquarters and six companies) specially trained in water work. The O.C. of the engineers was the water-supply officer of the army on the staff of the chief engineer. "Water points" consisted of elevated tanks or excavated reservoirs, lined with canvas or concrete. When there were large numbers of troops in the area water was delivered in gross from the water points by water-tank trains. Individual organizations obtained their water from water points by means of water carts; one cart was allowed to each company of dismounted troops. The purity of water was determined by analyses made in laboratories. There were three types in the field: mobile laboratories, very similar to those in use in our armies; transportable laboratories, in which the equipment was packed in boxes and could be set up in any place to assist the mobile laboratories;

and the laboratories, in the water purification trucks, known as "sterilabs." Very little use of these was made, as the water officers with these machines merely determined the presence or absence of free chlorine in the water. There were other large more or less fixed laboratories at which water examinations could be made when desired. About eighty-five per cent of the samples examined required to be "sterilized," and liquid chlorine or the compounds of chlorine were used for this purpose.

Wallace Tiernan machines, employing liquid chlorine on both the direct and solution feed treatment, were installed in camps, at large hospitals, in cities and towns where at least 1,000 soldiers were assembled. On the lines of communication (services of supply) eighty such machines were provided in the various sections.

Mobile water-purification machines ("sterilab") in which the water was filtered, chlorinated and dechlorinated, and then pumped into reservoirs or into motor tanks, were designed by the Americans on much the same lines as those with which our water companies were equipped in 1916. They were used to supply troops with water when a permanent supply was not available at the place of concentration.

For the same purpose a chloro-pump was also employed; this was a mobile unit similar to the "sterilab," but had no filter and could only be used when the water was clear. Both the "sterilab" and the chloro-pump had a small laboratory on the chassis.

Where a central chlorinating plant was not provided, water-sterilizing bags, water carts and tanks were used, and the water was sterilized by means of chloride of lime, packed in 1-gram tubes, which was allowed to act for thirty minutes. There was no clarifier or water-testing case, such as was issued to our troops.

In many instances in the zone of the armies, water in bags, carts, and tanks was sterilized by means of Javelle water, obtained from the French.

The effects of chlorination were judged by bacteriological tests when necessary, and the production of ten per cent, or more, gas in twenty-four hours in lactose broth was accepted as a reliable test of the presence of *Bacillus coli* in the water.

The disposal of excreta and waste products was on lines familiar to all our officers, and calls for no special comment.

The control of venereal disease among American troops in France became a very important problem. The methods adopted "comprised the prevention of infective contacts and the prompt prophylactic treatment of persons exposed." These were supplemented by "such forces as social hygiene, recreation and discipline." For the prevention of infective contacts, licensed houses of prostitution were put "off limits," and troops were not allowed to enter the areas containing houses of prostitution and grog shops, except on *bonâ fide* business. The French authorities at St. Nazaire protested that the American system, which was diametrically opposed to their own method of control, would result in a great increase in rape and seduc-

tion, and would increase clandestine prostitution; they, however, supported the American authorities as far as possible, but asked that all American troops should be carefully inspected before disembarkation, and that all contagious venereal disease should be promptly treated. The Americans found, later on, that the incidence of venereal disease in St. Nazaire among the troops had been much reduced by the measures adopted, and that there had been no increase in rape or seduction.

Every effort was made to reduce clandestine prostitution by deporting, under the French law, all women practising prostitution and street walkers.

Inquiries showed that 75 per cent of the cases of venereal disease occurred when men were on leave, and an effort was made to control the movements of men on leave and house them together in certain hotels. All-night and week-end leaves proved a fertile source of infection, and such leaves were prohibited as much as possible throughout the American forces. Leave areas were administered by a commanding officer, adjutant, athletic officer, and censor. Men on arrival were met, taken to a place of registration, assigned to hotels, instructed as to venereal disease dangers, and were also told where the prophylactic rooms were located. Men were examined before departure and after arrival in leave areas. These examinations disclosed the fact that many men acquired venereal disease *en route* to the leave areas, and a medical officer and two men of the Medical Department were then detailed for duty on all leave trains of the First, Second, and Third Armies, and were equipped for the purpose of rendering medical prophylactic treatment.

Medical prophylaxis for venereal disease was made compulsory in the American army in 1912, after a preliminary trial of voluntary treatment had failed to reduce the incidence of venereal disease in the army, and the annual rate fell from 145 per 1,000 in 1911 to 91.2 in 1916. One of the earliest orders issued from Headquarters A.E.F., Paris, in July, 1917, directed all troops to report to an official prophylactic station within three hours of exposure to infection, and required that men who acquired venereal disease by neglect should be tried by court-martial. A commanding officer of a battalion was ordered to establish a prophylactic station in a convenient place at the entry to the camp.

During the summer of 1918 no leave was allowed, but when leave was granted in October there was a sudden rise of thirty per cent in the venereal rate. This led to further inquiries, and the appointment of three experienced medical officers for inspection duty in connection with venereal disease prevention. Defects were remedied, and medical officers were ordered to follow up men who had failed to report within three hours and require their attendance for two further days' treatment. Out of 242,000 prophylactic treatments in the A.E.F., only 1.3 per cent were failures, and these were attributed to intoxication, incomplete treatment, or treatment after three hours.

Men suffering from uncomplicated venereal disease were treated with

their units when the divisions were in training camps, but when these entered the front line, venereal cases were segregated in labour camps.

The remaining chapters of Volume VI deal with the prevention of lice, prevention of scabies, rodent eradication, and an analysis of the incidence of communicable diseases.

The monthly diphtheria incidence rates and those for measles and cerebro-spinal fever per 100,000 strength in the British Expeditionary Force and the French armies were at all times far below the rates of the American Expeditionary Force.

In terms of sick wastage and days of service lost, mumps was the most important disease in the A.E.F. Approximately 1,021,636 days of service were lost through this disease.

Volume VI contains a very complete record of the work in the field of hygiene carried out by the Americans during the World War, and will doubtless serve as a work of reference for many years to come.

A perusal of this volume leaves us with the painful impression that many lives might have been saved had America been able to profit by the experiences of the Allies. Unfortunately, time was everything, and in their desire to succour the allied forces after the *débâcle* in March, 1918, the American authorities had to take risks which they would not have done in other circumstances.



Clinical and other Notes.

CASE OF MULTIPLE ABSENCE OF PERMANENT TEETH.

BY MAJOR D. CLEWER,
The Army Dental Corps.

A CASE of unusual interest recently presented for treatment at the Dental Centre, Gibraltar, and, as such a condition is probably unique in military practice, it is thought that the following notes may be worth recording.

Bombardier B., aged 24½, service six years, reported for treatment complaining that his teeth were loose and that he was unable to masticate

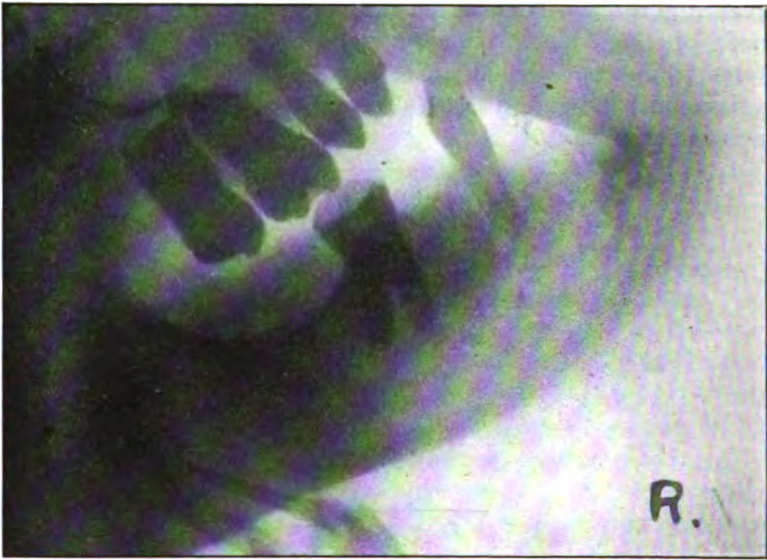


FIG. 1.

his food. On examination he was found to be a case of deficiency of eighteen permanent teeth.

The teeth *in situ* were:
$$\begin{array}{c|c} 7654c1 & 1c4567 \\ \hline 74ba & abc4 \end{array}.$$

$\overline{7}$ had been extracted, but the patient very definitely states that the only other tooth that has ever been removed was \overline{c} .

Radiographs (figs. 1, 2, 3, 4) were obtained and, as here shown, confirm the diagnosis, the teeth absent being:
$$\begin{array}{c|c} 832 & 238 \\ \hline 865321 & 123568 \end{array}.$$

The N.C.O. states that, at the age of 3, he had a severe erysipelas and it is a question if a profound disturbance of metabolism as a result was the causative factor. So far as can be ascertained, there is no family history of abnormal dentition. The nails are normal and there is no deficiency of hair, except for a slight alopecia on the crown of the head. The chest is,

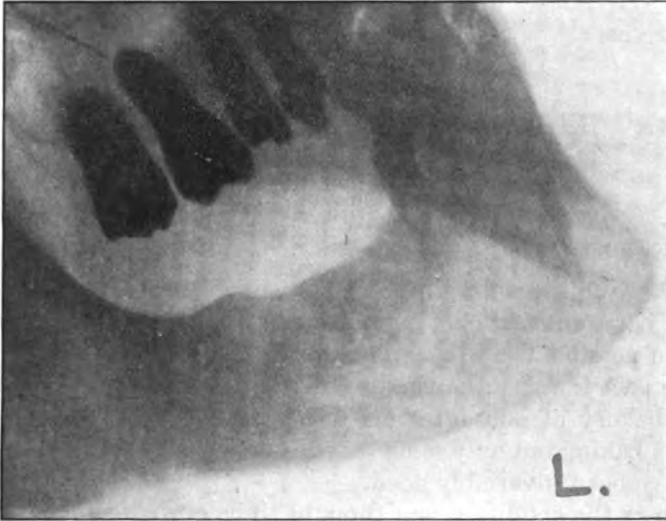


FIG. 2.



FIG. 3.

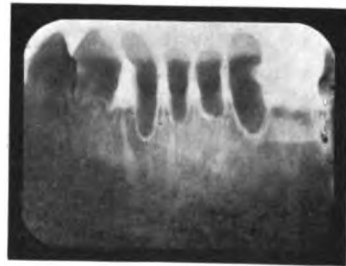


FIG. 4.

however, distinctly hairy, and in general there is no sign of integumentary defects.

Marked inferior protrusion exists with an abnormal temporo-mandibular articulation, the patient having subluxated his mandible on four or five occasions.

So far as can be seen, there is no evidence of thyroid deficiency, and he appears normal in all other respects.

Treatment will comprise extraction of the deciduous teeth and the supply of dentures.

I am indebted to Lance-Cpl. Rothbard, R.A.M.C., for the radiographic work, and to Lieutenant-Colonel G. E. Cathcart, O.B.E., R.A.M.C., and Colonel J. W. Langstaff, D.D.M.S., Gibraltar Command, for permission to publish this case.

NOTE ON *BACILLUS MESPENTERICUS* CONTAMINATION OF BREAD.

BY LIEUTENANT-COLONEL M. C. BEATTY.

Royal Army Medical Corps.

THE following short description of an experience in a bakery which, it is thought, is an unusual one, is published on account of its great practical interest and possible use to members of the Corps.

For the past few months the bread from the Navy, Army and Air Force Institutes bakery at odd intervals has been sour and uneatable, not the whole day's baking but only some loaves, and especially the 4-lb. ones. The pastries have been invariably good.

On inquiry the condition was thought to be one of so-called "ropiness." The appearance and condition of the loaves when freshly baked did not materially differ, but on storage for from two to seven days the bad bread would at first smell sour and was sticky to the touch, gradually becoming worse, until the smell eventually became disgusting and the centre of the loaf an evil-smelling, partly liquefied, dark mass.

The flour, on analysis, was found to be good; the yeast used was German grape yeast of the best quality.

The bakery itself is fairly modern, with concrete floors and stairs, and white-tiled walls.

The immediate steps taken to remedy matters were: Scrapping of old baking troughs and tables, provision of new troughs and marble-topped tables, painting woodwork and whitewashing walls, daily disinfection of floors with cresol followed by scrubbing and sluicing.

For several weeks no bad loaves were found, and then in one baking three turned sour. Major Houston, Deputy Assistant Director of Pathology, examined one and isolated the *B. mesentericus* which, according to Kenwood, is the responsible organism.

After this, all water used for dough mixing (as it is a water-borne organism) was ordered to be boiled, and this is an interesting point: on visiting the bakery for sample taking, the boiled water was found to be stored in a large metal receptacle covered with muslin and emptied by means of a ladle. Samples of this were taken by the same method, also

one from the tap used which is direct off the main, and one of the dough, the result being that *B. mesentericus* was found in the boiled water. The tap-water and the dough were negative.

It need hardly be said that the method of boiling and storage is now altered.

The conclusion come to is that the premises are contaminated with the spore-bearing *B. mesentericus*, and that only continuous and concentrated effort at disinfection and cleanliness is going to be of any avail.

As far as is known, there has been no record of any such contamination of a bakery in England, but it is understood that it is not an uncommon occurrence in America when there is a high atmospheric humidity, and curiously enough, I saw a letter in the Master Bakers' Association magazine a short time ago, from a correspondent in Malta, describing a similar condition there in a bakery and asking advice.

The origin is difficult to locate; it is surmised that the contamination may have been carried from the previous premises which were unsatisfactory and in which, it is understood, the trouble occurred, though in a very minor degree, or it may have been in existence in the present premises when taken over from the German occupant.

A point worth noting is that, unless there is a heavy contamination, infected bread may not be recognized until after the lapse of several days, and that one day's baking may prove good, sandwiched between two bad days' bakings.

It follows, therefore, that once premises are contaminated a clean bill of health cannot be given for at least a fortnight.

Sport.

A TALE OF TWO PANTHERS AND A TIGER.

BY MAJOR R. H. CORDER.

Royal Army Medical Corps.

IN life, fortunately perhaps, our successes loom large and bright, while failures dissolve away and are forgotten. Still, actual success is not always the "be all" and "end all" of our efforts. To recall a day's sport which ended perhaps in failure as regards the actual kill may give as much pleasure as to recall an occasion when success crowned our efforts.

One scorching hot day, with thirty days' "Leave on private affairs," I boarded the early morning train at Bareilly and filled the carriage with a collection of gun cases, fishing rods, bedding, hurricane lamps and kerosene oil tins, which seem to follow the Sahib everywhere in India. Soon we were slowly jolting along, arriving in due course at Kathgodam. Here coolies were engaged to carry the aforesaid kit up the hillside to my destination,

Nauchachia Tal, eleven or twelve miles away. High up in the Kumaon Mountain is a group of lakes and the remains of others which some long ago earthquake, breaking away the containing wall, allowed to empty themselves into the plains below. Nauchachia is easily the most beautiful of the lot and lies embedded in a deep valley at the top of the range. By the "lake of nine points" is an old temple, and it has been stated that anyone who, at one and the same time, saw all nine points from its vicinity would enjoy future happiness. I have tried often to see them but always failed and fear the worst.

A mile above Kathgodam we leave the main road and, crossing a narrow suspension bridge, start a long climb up the narrow hill path. The path is only practicable for men and animals, and quite steep enough to test the wind of newcomers from the plains. The coolies prefer the "Chota rasta," which consists of a path known only to themselves and running apparently up the side of a sheer precipice. How any human beings can climb this path, loaded as they are, I do not know. I have been told that a man once carried a piano singlehanded up the precipice, but died at the top. I am surprised that he did not do so at the bottom !

A three hours' tramp brings us to the dreary looking, half empty Bhim Tal, a further three miles and Nauchachia comes in view. This beautiful little lake lies in a deep hollow embedded in overhanging trees. The surface is like glass, seldom disturbed by a summer breeze. Unlike the other lakes, the water is quite clear and fish can be seen floating in the depths. These two factors of clear water and absence of breeze add greatly to the fisherman's difficulties, and bags are seldom large until the evening shadows assist his efforts.

The baggage having arrived all are quickly settled in. The local shikari arrives to inform the unbeliever that the lake swarms with mahseer and the hills with leopard, and even tiger, or indeed any other animal the Sahib chooses to mention. Evening rapidly closes in with that death-like stillness always remarked by visitors from noisy cantonments. The stillness is only broken, now and then, by the bark of a startled kakher or the splash of a fish feeding in the shallows.

Early next morning a start is made with the mahseer, but owing to the usual absence of breeze, and presence of sun, the bag is small. Indeed one's only chance is in the occasional shadows thrown by the overhanging trees. Towards evening, just as one was preparing for the long hoped for evening rise, an "admi" informed us that a "luggabuga" had killed a calf near his village that very morning. The rifle, a pillow to use as a machan, and a hurricane lamp were soon collected, and in spite of the late hour, the shikari and I started on a five or six mile tramp down the khud side into the gathering darkness. There is always something weird and terrifying in walking through a thick jungle in the dark. No matter how accustomed one is to camp life the "jungle fear" creeps over one as the darkness deepens. However, on we go in a little circle of light thrown

round us by the hurricane buttie, only pausing about half way to load the rifle. One never knows what one may meet! We rapidly descend into the valley and at last reach the village. There were no outward signs of the morning tragedy. Losses due to leopards or tigers are far too common for comment and are taken as the ordinary events of life. Compare this attitude with a village at home where a dog has worried a sheep. The whole place is agog, and the field trodden flat by visitors to the actual site of the crime. After a little search a man was found who could lead us to the spot where the victim lay. As we approached a snarl informed us that we had disturbed the leopard at his evening meal. However, we advanced, and the animal withdrew into the darkness. The victim, a calf, lay half hidden by some bushes, just as he had fallen, and his outstretched neck showed the teeth marks of the leopard. A small portion of the buttock had been eaten but otherwise the body was untouched. A small tree, the only climbable one in the vicinity, was selected and the pillow placed in a fork, only eight or ten feet up. I settled myself down and the shikari and villagers, after hurling a few curses into the darkness in the direction of the leopard, withdrew, taking the light with them.

The last flicker of the light had vanished and I found myself alone in almost absolute darkness. So dark was it that I could hardly see the kill, lying a few feet away, except one large white patch on its side. It was now too late to do anything, and in any case there was no time. A few moments after the departure of the villagers, a gentle footfall announced the return of the leopard. For a moment its head was visible against the white skin of its victim's side and then it was swallowed up in the darkness. He settled down at once to his interrupted meal. What was to be done now was the difficulty. I knew there would be no moon, and I did not intend to await the dawn in my uncomfortable perch. Rather bored I gently tapped the trunk of the tree in which I sat, with my rubber soled shoe. Even in the stillness I could not myself distinguish the tap, it was so light. Not so the leopard. Those microphone ears caught the unusual sound. The meal ceased in an instant, and I seemed to feel his eyes stabbing the darkness as he gazed in the direction from whence the sound came. I remained absolutely still, and Spots, satisfied that nothing was wrong, resumed his meal. Again I tapped. This time he was annoyed, and an angry snarl showed his displeasure as he again looked round for the author of the noise. In dealing with dangerous carnivora one must remember that they do not always react to any given set of circumstances in the same way, and in taking liberties with them a margin of safety should always be kept in hand. My legs dangled only a few feet above his head, and it was not advisable to overstep the safety margin. I aimed the rifle at the ground and pressed the trigger. Two quick scarce-heard bounds and the leopard had gone. I was about to say vanished, but as he had never materialized in the darkness, this would not be correct. A few shouts, and the villagers and lamp returned. I was subject to a gloomy

look of disgust from all. Natives will not understand that the Sahib cannot see in the dark. We gathered up the pillow and rifle and silently started on our long walk home.

N.B.—In future get to the kill early and bring an electric torch.

A few days later, a small boy brought news at breakfast time of a tiger kill at his village, seven or eight miles away. He was quite certain that it was a tiger, and in fact hinted that there were two. The shikari and a coolie carrying machan and ropes were soon on their way down the hill-side, while the boy remained to show me the way a little later. After an early lunch I started, and my guide led me first along the valley and then up a shoulder of a hill and down the other side.

The top of the hill was lightly wooded and uninhabited; lower down were numerous clearings where Indian corn and potatoes flourished. Deeper still lay broken ground covered with dense jungle. A little stream ran at the bottom of the great gorge and was a delight to see in the stifling heat of the enclosed valley. Close to a little "penchuckie" was a deep pool, and it was only a moment before my shorts and shirt were off and I was swimming about. I had a vague idea of hearing little squeaks as I undressed, but took no notice. After a short swim I got out, and sitting on a stone resumed my clothes. I now discovered that I had presented a most entertaining picture of a white Sahib in his "birthday suit" to a group of village maidens hidden in the little mill. The march was quickly resumed and shortly afterwards the shikari met me and announced that a very "bobbery" leopard was lying up near the kill and had already slain a vulture foolish enough to approach. We climbed the hill to get a good view into the nullah from above, but a most careful search failed to reveal the leopard. On the cliffs round and in the tree tops were perched some twenty-five or thirty vultures. They dared not come down to the tempting feast spread below. The fate of their companion had warned them. Each sat hunched up and motionless, in that attitude of the deepest gloom and depression only seen in melancholic lunatics and vultures. Our arrival caused a moment's stir. "Perhaps the Sahib would do something about it." Necks were raised and heads turned. The Sahib did nothing. The blanket of gloom descended on them once more.

We then went down and viewed the kill. A full-grown cow with an undoubted broken neck. Near the kill was a nice tree but growing very close to the cliff and not at all safe if a tiger was about as he could easily claw one out from the cliff side. Across the river was a rocky cliff with a jutting-out ledge giving a fine view over the kill. This site was not too safe either, as often a tiger or leopard will look out for such a piece of high ground on which to sit and watch his kill. However, as there was no other site the ledge was chosen and the shikari and I established ourselves. It was now about 3 and getting dusk. Darkness comes early in these deep valleys and one must not be seen moving about late. The vultures, one by one, giving up all hope of a meal, launched themselves into the air. One or

two flaps of their huge wings and, caught in some invisible current, they floated upwards into the sky.

Possibly an hour had passed, when the shikari touched my arm and pointed high up the hillside. A cat-like form, half hidden in the grass and bushes, could be seen quietly walking down the hillside. We lay flat on our faces. A move might give the show away as our hiding place was overlooked from the higher ground on which he stood. The shikari glanced at the rifle but I shook my head. In the gathering dusk 100 yards was too far. On he came until he reached a clearing about seventy-five yards off and in full view of the kill. Something caught his attention. He sat down on his haunches like a great dog and proceeded to "appreciate the situation." After ten minutes he lay down and further considered the problem. Twenty minutes later, having come to a decision, he rose and quietly continued his walk down the path. He now reached a point above and some twenty-five or thirty yards from the kill which lay in the rocky river bed below him. Now came the surprise, no doubt the result of his half-hour's cogitations. He turned sharp left, away from the kill, slowly climbed the hill and vanished over the brow. "Shitan," said the shikari, and I repeated the remark in English. There was nothing more to be done. I finished my sandwiches and, regardless of the morrow, drained my thermos of coffee to the dregs. Reluctantly I selected a couch amongst the hardest rocks in Asia, and throughout the night fought an unending battle with mosquitoes as large as bats. Just as dawn began to break and I felt that endurance had reached its utmost limit, the shikari, who apparently throughout the night, unmoved by the hardness of the stones or the attacks of the mosquitoes, had kept an unblinking watch over the kill, touched me and pointed. Slowly up the nullah under the shadow of the cliff came our friend of last night. He, or rather she, walked right up to the kill and inspected it. Sniffed it all over and then quietly turned away and walked down to the water directly under the ledge on which we lay. There was just enough light to slip off the night sights and aim between the shoulders. I pressed the trigger and fired. Not a move on her part, not a twitch of her tail even. There she crouched in the same position. Still covering her I told the shikari to throw a stone. It bounced on her back and I lowered the rifle. She was stone dead. Later we found her mouth full of stones and all her teeth broken as she had crunched them on the stones in her death agony. The shikari went off to get some milk from the near-by farm. I made my way down to the river bed to inspect the kill. A gentle swish of wings announced the return of the vultures, hoping for better luck to-day. By a curious turn of luck the murderer of their companion of yesterday was to furnish them with a most acceptable early morning meal. A couple of hours later, having boiled and drunk some milk and helped to skin the leopard, not forgetting to remove the two "lucky bones" from the base of the neck, we started homeward with the skin and head tied up in a loose bundle. The village maidens had gathered at the mill as we passed

and demanded to see the skin. It was spread out for their inspection, but not before I had warned the shikari to keep the head covered and under his hand. I wanted no itching little fingers amongst his whiskers. These love tokens are much prized. A moment's forgetfulness would have resulted in a whiskerless panther being later set up. Back we went up the little path past the various lonely farms. Early as it was all were about and had by some mysterious agency already learned that we had been successful. A few hours later and after a bath and shave I was enjoying a late but very welcome breakfast. I have often wondered why that leopard twice left the kill untouched. Did she know that it was not hers. It looked so like a tiger kill. But perhaps it was only due to the vagaries of her sex.

One of the ambitions of my life is to kill a tiger. There are plenty of them about but it is not too easy for the military to get them. The civilians are more in touch with the country and get "kubber" first and usually stick to it. It was with the greatest pleasure I got a note from an old friend that there was a tiger in his neighbourhood. He had tied up and had a kill but had missed. He now suggested that I should try my luck. Very early I was following the long trail from Nauchahia to Naini Tal. In part I followed the road but, being in good training, here and there took short cuts through the hills and along native footpaths. At Naini I hired a car to do the ten or twelve miles to the bungalow, where operations were to start. On arrival I heard all about the unsuccessful "sit up." The tiger had arrived in nice time. Somehow he had been clean missed in three successive shots! Much worried, my friend had the following day gone into Naini to consult an eye specialist: This expert, too, was unable to account for the catastrophe. The following day I tied up and spent the time shooting in a near-by nullah. There were plenty of pheasants about but they were by no means easy to shoot. The second morning the shikari appeared and his pleased expression and jaunty walk gave the show away long before he had crossed the compound. The buffalo, tied up in the same place as the former kill, had been taken, but the tiger, possibly remembering his former reception, had carried the body about half a mile down the nullah and hidden it in some thick jungle. Soon the shikari and a couple of coolies were off, carrying a machan, ropes, blankets, etc., and after lunch I followed, taking a basket of food, a rifle and a twelve bore. A couple of hours brought me to the bottom of the nullah and here I found the shikari and coolies. The machan was ready. I tested it, saw that I had a clear line of fire, made all ready and told the natives to come back early the following morning. I settled myself down for a long wait. Once in a machan stillness is a most important point. The slightest move will give the show away. The tiger or panther may come and sit nearby, watching, but unknown and invisible.

If he is not satisfied that all is clear he will depart and you will never even know he was about. There is always plenty to watch and note in a forest in the evening. Pheasants come down to water, making a rustling

n the leaves, which makes you think a large animal is on the move. Small animals trot to and fro, and troops of monkeys come and go. The absence of movement, or much chattering on the part of monkeys, is a suspicious sign that the tiger is about and one's vigilance should be redoubled. I waited for a couple of hours, perhaps, when there was a sharp crack of a breaking branch and a deep growl. I sat rigid, eyes half closed to prevent blinking, and every second expected to see the tiger walk out into the open. Suddenly there was a crash over my head and the whole tree seemed to sway. A cold shiver ran down my back and my hair rose on end. One's feelings can be imagined. Alone in the dark in the jungle, with a tiger below you, and "God knows what" in the branches over your head! I swung around to find a huge langur sitting above me and regarding me with a horrified expression. He gave a startled grunt and made a great bound into the next tree and was gone. So, too, had my tiger! That startled movement had cost me his skin. Hoping against hope, I sat on for an hour or so. By now it was too dark to see. I unloaded the rifle and put it safely away. Loaded my twelve bore with a couple of lethal bullets and placed it handy. A twelve-bore is ever so much more useful in the dark. It "comes up" by itself and there is no need to find the sights. Of course, its range is very limited, and it makes a big hole. I had my dinner, rolled my blankets about me, and lay watching the darkening sky through the branches of the tree and wondering what were the various strange noises heard from time to time.

How long I slept I cannot say. Suddenly I found myself very wide awake and with that instinctive knowledge, handed down to man through the ages, warning me that something was about. There was no doubt about it. The tiger was back and already on the kill. I could hear his deep breathing and the crunch of his jaws a few feet below me. The moon was "full on," and I lay picturing to myself what a magnificent shot I should have in the bright moonlight which, looking up through the trees, seemed almost as clear as day. How to get up was the puzzle. Well we know the hyperacute sense of hearing of an animal such as a tiger or a leopard. However, something must be done. Slowly I unwrapped the blanket. Not a sound. The meal continued. Catching the side of the machan with one hand, I slowly raised myself and stretched out my hand for my gun. The meal was abruptly terminated. The tiger had heard the movement. I glanced below. Nothing,—black darkness, deep shadows thrown by the trees, and watery patches of moonlight. No sign of the tiger or even the kill. I had quite forgotten, when looking upwards into the moonlit sky, what a contrast it would be to looking downwards into jungle shadows. Moonlight is a poor thing after all. I could hear the tiger breathing, and for a moment we stared at each other through the darkness. Without a sound I saw a dark mass move away. So indistinct that it appeared only as a deepening shadow. For a second time my tiger had gone. I rolled myself up once more and slept until the shouts of the returning coolies roused me to a long climb back to breakfast.

Travel.

A TOUR UP THE IRRAWADDY.

BY MAJOR L. B. CLARKE.

Royal Army Medical Corps.

MOST well-informed people know that the Irrawaddy is a river of Burma. How many are there who realize its navigable length? That steamers of over 200 feet can proceed on their way, undeterred by shoals or rapids, is one of the many surprises that await the newcomer to this most distant province of our Indian Empire.

From Rangoon in the south to Bhamo in the north, the Irrawaddy Flotilla Company provides a service of ships which will bear favourable comparison with many of the world-famed liners of the open sea. This great distance of inland navigation is divided into two natural stages, the lower or deltaic, and the upper or mountainous. Mandalay, the former capital of Burma, is at the junction of the company's two services. Here the traveller, if he has come by water, changes on to the steamer for Bhamo. As most of the lower reaches of the river traverse flat low-lying paddy fields, there is not much of interest to attract the tourist and most people go by train to Mandalay and embark there.

A conjunction of favourable circumstances recently allowed the writer to spend a short leave in this way.

Mandalay, as the old capital of the Burmese, is a place full of interest in many ways. The royal palace of King Thibaw, in the centre of the moated fort, is the only Burmese palace in existence at the present day, as the wooden buildings in this country have a lifetime of barely fifty years. Occupied for many years as an officers' club and probably thereby preserved from vandalism, it was, under Lord Curzon's regime, entrusted to the Government of India. Its chief feature is the vast number of circular columns of teak which support the various conventional roofs of Burmese architecture. The columns rise in their former gilt splendour to a great height, and many mighty trunks of the forest must have been felled to provide cover for the royal head.

On the south side of the palace stands a small obelisk commemorating the fact that here on this spot stood a pavilion in which, on a certain day in the year 1885, King Thibaw surrendered to the General Officer commanding the British Army, and Upper Burma became part of the Empire.

Mandalay was one of the many places which the Burmese had chosen for their capital. On the accession of each king the nats or spirits always decided where the seat of government should be. The king, being their

interpreter, usually announced their decision in accordance with his own wishes; the result is that many a fair corner of Burma contains relics of an ancient capital.

As Mandalay does not possess any hotels we embarked overnight on the steamer. The tourist season had not commenced, and the only other passenger was an engineer from the oil-fields who, with a very keen and interesting captain, made pleasant company.

The s.s. "Shwemyo" is the bazaar steamer, that is to say, she has tied alongside her a large double-decked flat, which together with the ship itself carries about thirty native stallholders complete with their travelling shops. The entire trade of the riverine districts is done with this steamer, and the great event of each week is the arrival of the bazaar steamer, for there are no roads or railways on which these places can rely.

We started on our run of 320 miles to Bhamo on the Monday at 7 a.m. The comparative flatness of the Mandalay plain soon gave place to distant hills of pale blue, which on closer view proved to be mountains of no mean size. The river being in flood the current was rapid, and the usual landmarks being submerged navigation was a matter of some skill, necessitating the services of a local expert pilot at each stage.

Numerous small native villages were passed, quaint little settlements with a score or so of fishermen and their families, perched aloft in their bamboo huts which are invariably built on stilts. The Burmese being Buddhists are not allowed to take life. They catch their fish, where no killing is of course involved, and they then place them on the bank to rest. The fact that the fish are so foolish as to die does not disturb the Buddhist conscience. The trade in fish which have been so unfortunate as to succumb is widespread and lucrative.

It is easy to be captious at other people's manners and customs, but let this be said for the Burmese—they are a very charming race. It has been one's fortune at one time or another to have met nearly every nationality from the Balkans to Burma, and one can say without fear of contradiction that these people are cleaner, neater, better dressed and smell less than any others one has encountered in the Near or Middle East. They have their faults, of course; they are not fond of work, and one sees a typical picture any day one likes of an Indian cooly pulling a Burman about in a rickshaw in Rangoon. They are very fond of beautiful clothes in all colours of the rainbow, they are very emotional at times, and they are inveterate gamblers. On the other hand, they are always happy and cheerful, always smiling and full of fun, without a care in the world, and apparently nothing disturbs them in the even tenor of their way.

All along the river one sees the various races of Burma coming to buy their weekly supply of goods from England, America and Germany. They collect on the river bank with articles to barter or money to purchase, and engage in much animated conversation while the ship is tying up alongside. Four stalwart men of the crew, two Burmans and two Indians, are seen

to take up their position at the bows, and when the steamer is sufficiently near the side, one man takes a hawser between his teeth and all four jump into the water and swim ashore. A tree trunk is selected and the hawser fastened to it. With this and the anchor the ship is now secure. The dinghy is brought round and planks placed across it to the shore.

A united effort on the part of those on the boat trying to get ashore and those ashore trying to embark, all intent on their immediate business, leads to some confusion, perhaps a little wetting, and causes inevitable delay. Once one-way traffic has been established, the commerce of the country commences. The articles sold on the ship are manufactured ones, and it is possible to buy almost anything. One could procure a good quality silk scarf at two rupees, also a tin of talc powder and a packet of safety pins. Various articles of local produce, such as dried and, to be candid, rather evil-smelling fish, vegetables, fruits, silks and home-made pottery are often bartered with the stallholders on board.

Only one stop was made on the first day, and at a small and picturesque village we tied up for the night. Here, with about half an hour's daylight at our disposal, there was only time for a short swim in the comparatively quiet water close to the bank.

On waking the next morning the ship was already under way, and there were soon fresh scenes of interest to attract the eye. The wide expanse of water to which we had become accustomed now contracted down to just an ordinary-sized river such as one would have at home, and we approached the entrance to the third defile. The narrower stream now entered runs for forty-six miles in a series of straight stretches separated by jutting headlands. On each side the bank rises steeply; it is almost entirely covered with thick vegetation, and innumerable trees, shrubs, grasses or impenetrable undergrowth fight the age-long battle for supremacy. Very frequently the original tree is no longer living; it is merely an inert prop for some winding creeper which, commencing life as an insignificant parasite, has in its growth sapped the life-blood of its host and now assumed gigantic proportions, obliterating all traces of the former structure of the tree.

The current gradually becomes more rapid and renders navigation difficult, whirlpools are encountered, and as the paddles enter the revolving waters a weird crunching sound occurs. Driftwood and all the flotsam and jetsam of a great river pass on their way. Now and then enormous rafts of timber of one hundred yards in length, valuable trunks of teak from the forests of Upper Burma, drift slowly past on their leisurely two months' journey to Rangoon, to be sawn up and exported all over the world. On each raft is seen one or more bamboo huts in which live the man in charge and all his relations. At bows and stern are several canoe paddles with which such steering as is done can be carried out. A flag-pole with the timber company's flag by day and a light at night complete the equipment of these strange craft. Occasionally, if the crew is very pious, an improvised

pagoda may be seen. This may be so, but one's personal experience was that piety had given place to somnolence, for more often than not only the loud and insistent hooting of the ship's syren saved ship and raft from head-on collision, sleep apparently claiming the crew for many hours of the working day.

Presently we stopped at a wayside settlement, which is the port of call for the ruby mines which were worked centuries ago by the Chinese and, judging by recent discoveries, at an even earlier date, by means of bronze implements. A party leaves for the mines and we resume our journey.

At the end of the defile whirlpools increase, and we zig-zag from side to side to avoid them. A halt is made at a small village set in attractive surroundings with a pagoda-covered headland projecting far into the tumbled waters of the stream, and set in its centre is the prosaic bungalow of a lonely Englishman. A short walk on shore while bazaar business is being done affords some exercise, and then the ship steams on.

We enter open country with views of distant mountains towering into the rain clouds on our right, which indicate the presence of a lofty tableland, whereon is situated a wild and primitive independent state. The change from the confined vista of a narrow stream is great.

A long wide channel takes us to one of the most charming of the Burmese villages, seen from a great distance to be nestling at the foot of small verdure-clad hills dotted with pagodas. On closer view a clean little hamlet is found close to the water's edge. The people who turned out to see us stood at first in the broiling sun, interested spectators of our mooring. Then, realizing the heat of the sun they raised their umbrellas or softly toned native sunshades, after which they squatted on their haunches, and when hot and bored they betook themselves to the shade of many a bungalow and there till sleep claimed them continued their languid interest in the steamer. One sees in Burma the most beautiful colour schemes in the loongyies or silk skirts that men and women equally affect, but here in this small out-of-the-way place the colours surpassed anything previously seen. A show window at Liberty's would not contain anything richer or more beautiful.

In spite of the heat an afternoon walk was taken as the surroundings of the village seemed attractive. A short way up stream there was a big headland, on the other side of which was a fishing station. It was rather intriguing to watch a small boy manœuvring an enormous dug-out canoe in the waters of the numerous whirlpools. It seemed impossible to steer in any desired direction, yet this youth of but eight Burmese summers, after revelling in many twistings and turnings amid much laughter and obvious enjoyment, brought his ship safely to port.

The evening's walk took us to a large creek, obviously an ideal place for a swim, but we had reckoned without the geography of Burma, for the creek proved to be but an alternative channel to the one along which the

boat had come, and the current in the middle was rapid. However, a short swim alongside the bank was possible. Before we left, some men in a canoe crossed over to the other side and drove some cows into the water and it was interesting to watch the animals swim back to our side. The current did not appear to worry them much, in fact they seemed to allow for its carrying them where they or, at any rate, their master wished.

On the following day, owing to the uncertain depth of the channel, soundings were taken, as had been done less frequently all the time. A Burman stood on the far side of the flat and threw a plumb line into the water. With each observation he called out to the captain in a melodious sing-song way, reminiscent of the steersman in Wagner's "Flying Dutchman," "Yem, yar, yay," which indicated no precise depth, but stated "the ship has water." This was the sturdy lad who swam ashore with the hawser between his teeth. He became rather tired and weary, and after a while had a look across at the captain, who was engaged in filling in a return (such things apparently exist in civil life). A few more "Yem, yar, yays" and then he rested against a stanchion and, the captain being still engrossed, a bright idea struck the lad, not for the first time one imagines, and he hauled in his plumb line and continued his refrain, watching meanwhile what the captain was doing. The return must have been one of those brain twisters, and the skipper was able to think of nothing else. The youth leant over the rail, borrowed a big Burmese cigar from a friend and squatted down under cover of an awning and puffed away contentedly to a frequent repetition of "Yem, yar, yays," irrespective of our depth, his only anxiety being to evince an occasional interest in the captain, which he was able to do without much exertion by inclining his head and looking over the awning. After a time thus pleasantly spent his meditations were brought to a close by the solution of the captain's problem. The cigar was speedily returned to its former owner, the plumb line resumed its rightful function, the Wagnerian motive continued and the ship steamed on.

Katha, an important little place owing to its receiving a branch line of the railway, was our halt next evening. A long procession of natives in gala costume, headed by youths beating big drums and clanging cymbals, was viewed from the ship with interest. We heard that it was the Burmese equivalent of a flag-day and that money was being collected for a pwe or native play. No cinemas beguile the leisure hour of the Burmese lizard, or whatever word is in use when this is read, and the pwe or play, frequently of inordinate length, is performed in just the same manner as it was by the distant ancestors of the present villagers.

Early next morning we were on our way again, and the day passed pleasantly enough. At nightfall we had arrived at another village, and here fine views of distant hills gave some indication of the type of country we were to encounter on the morrow.

The last day on the upward trip took us through the interesting scenery

of the second or great defile. Here the river contracts from two miles to 300 yards in width. The stream is swift, the depth great, probably about 600 feet, there are many rapids and whirlpools, and navigation is extremely difficult. The bazaar flat had been left behind, and we continued on our way unhampered by the load and resistance offered by it. We approached the defile at dawn, a time of much beauty. Mists occluded the light on the upper heights, the sky was grey and the water a silver hue. Great jungle forests come close to the water's edge on either side, the course is snake-like, the hills increase in height and gradually is shown on the picture an enormous sandstone cliff rising 600 feet from the water. It is said that big game come to the defile in the early morning in order to drink. A careful watch revealed nothing more than a harmless monkey. Definite marks of elephants were seen on a sand-bank as we passed close by. One rather discounts elephants on the Irrawaddy. Once a tourist on this trip saw an elephant partly concealed behind some trees. He called the captain's attention and it was decided to stop and have a shot at the beast. The engines were stopped, the ship tied up alongside at the most suitable landing place, and the two shikharis started off. It was found that the current had carried them some little distance away, but the day was young and time of no consequence, and they scrambled through a good deal of rather dense jungle. Presently the elephant was in view, and in a short time they despatched him. They were rather mystified to observe a curious phenomenon—he had a chain tied round one of his legs. Investigation showed that the other end was firmly secured to a tree. Their delight was somewhat modified. Complete disillusionment came when the market price of a working elephant had to be paid to a well-known timber firm.

After leaving the defile we passed into open country again, and in the far distance were seen for the first time the hills of China. It is not easy to realize that we are so near that great country almost invariably associated with the Far East. Yet as we approach Bhamo, evidences of the Celestial Empire, or Republic, or whatever it is nowadays, become more marked. The people are more definitely of a Mongolian type, and some are pure Chinese.

Bhamo is seen long before one arrives, owing to its situation on a wide sweeping curve of the river. The distant view is attractive, the nearer one less so. Trees conceal its most interesting features.

We arrived at noon, our run from Mandalay being completed in six days, which is really rather a creditable performance when one remembers that the 320 miles has been done with a heavy flat alongside for the greater part of the way, and that the current against us has averaged anything from six to eight knots.

A population of about 7,000 people live in Bhamo, and many of these, apart from the Burmese, are Chinamen who have been here from time immemorial; in fact, it was doubtful for countless years prior to our annexation who was actually the sovereign power. Wars of a border type were frequent, and the Chinese have never quite made up their minds as to

whether they want the place at the present time or not. The reason for Bhamo being of international importance is that it is a river port within twenty-nine miles of China, and here the caravan route commences. The various animals composing the pack transport assemble beside the river and proceed, via China Street, on their way to the frontier, carrying a trade of considerable size.

In the town there is the usual native quarter with bazaars, and on the outskirts the cantonment where a small English community lives.

One shop in the bazaar is famed for its interesting curios and for the prices charged for them. Jade in many forms, dahs or native daggers, rubies, gold and silver ware, Chinese mandarins, uniforms, Shan costumes and bags, are all to be had—at a price.

Probably the most interesting sight in Bhamo is the Chinese joss house or temple, one of the very few outside China. It is conceived in typical Oriental style with the usual conventional upturned eaves. The entrance is through a circular doorway into a square courtyard, bounded by a quaintly decorated colonnade. Further in is a series of shrines or altars with many strange-looking gods sitting round the walls. Some are benign, others are obviously not so. A priest or some such functionary appeared on the scene, and amid many salaams and expressions of pleasure proceeded to explain the merits or otherwise of the various deities. It would have been more interesting and instructive had we been able to understand him, but the linguistic powers of the Englishman do not usually include Chinese. However, for our benefit or for his remuneration, we never quite decided which, he kindled at the sacred fire burning before the altar of a grotesque god a scented joss-stick which was presented with much ceremony. What to do with the wretched thing once we had got outside we had no idea, for we were obviously being watched and we had no wish to give offence. The proximity of the Flotilla Company's compound, however, solved the problem, for we entered and, when no one was looking, deposited the joss-stick on a convenient refuse heap.

At Bhamo one heard a good deal of the early history of the steamship company. Much is actual history, and the part the Irrawaddy Flotilla Company played in the annexation of Upper Burma is worthy to be told.

In 1835 events were gradually shaping towards a war between Britain and Burma. We were in possession of the lower part of the country with Rangoon as our principal place. King Mindon Min, the founder of Mandalay and an enlightened ruler, had died and had been succeeded by Thibaw and his versatile but scheming wife. Considerable friction occurred, our representatives were insulted, and finally matters reached a head when the Burmese Court imposed a fine of 2,300,000 rupees on the Bombay-Burma Trading Corporation and refused to allow arbitration. An ultimatum was sent to the king, and an expeditionary force assembled at Rangoon.

The present Commodore of the Irrawaddy Flotilla Company, a veteran of forty-seven years' service, who is still in command of one of the big mail steamers, was as a young and daring officer sent on this mission to

Thibaw. Arrangements were made that if he had not returned within a certain time, or complete acquiescence in the terms had not been received, the force would sail. The captain reached Mandalay without incident and there presented the ultimatum. The inevitable delay occurred and no reply was forthcoming. He remained in Mandalay. One day news reached him that it would be advisable for him to be on his guard, as the queen was rumoured to be arranging for his "disposal." Then he received definite information that his life was in danger. He returned to his ship, but only to be confronted with the fact that he stood no chance of reaching Rangoon, as a fort a short way down the river was ready for him with guns trained on the waterway, and below this, should he get so far, were two Burmese gunboats waiting with orders to intercept him. Now a curious thing happened; often in the East it is religion which shapes the destinies of nations, and so it was here. The fort was situated in a sort of cave overlooking the river, and by some remarkable chance it had been given out only the day before that an evil nat had taken up his abode in the cave, and nothing would induce the Burmese gunners to enter. When the captain arrived here all opposition had vanished, and he had only the "navy" of King Thibaw to deal with. He dressed himself and his crew in Burmese costume, and, availing himself of the saloon table cloth with the company's arms of a peacock (and incidentally those of Burma), he hoisted this at the masthead. He was now as good a Burman as ever sailed the Irrawaddy and, proceeding on his way, he met in due course the full strength of the Burmese navy. As he approached he disconnected the anchor from the cable and, drawing alongside the gunboats, he appeared to be making a friendly call. Terrific noises from the winch playing out the anchor, apparently, confirmed the belief that he was about to stop and pass the time of day with the Burmese officers. However, the water was very deep, and it took a long time to anchor; meanwhile the ship had drifted badly with the current and he was considered to be rather bungling it, when all of a sudden full speed ahead was ordered, and he went hell for leather down stream for Rangoon. Successful pursuit was impossible, and the attempt was not made, nor were the guns brought into action until he was well out of range. Speed was maintained for many hours, and by evening he was free from all anxiety. In two days he met the expeditionary force on its way up.

It is of interest to recall that the Irrawaddy Flotilla Company transported the entire army of 20,000 men, complete with stores and equipment, against a strong current the great distance of 708 miles to Mandalay, in eighteen days. The assistance that the company gave to the Government and the part played by the present commodore of the line indicate the spirit that encouraged the early settlers in this country.

The return trip was done in the express steamer. Helped by the current and unhampered by the flat, we reached Mandalay on the evening of the second day and disembarked the next morning, and so ended a leave full of interest and enjoyment.

Current Literature.

FISHENDEN, M. **The Effect of Weather Conditions upon the Heat Requirements of a House.** *Domestic Engineering.* 1927, v, 47, 137-46, 5 figs. [15 refs.]

This is a most learned and abstruse article, bristling with formulæ of alarming size and complexity. It is likely to be of interest to highly scientific experts.

It contains, however, a few items of useful practical information to the mere worldling. One is that the re-radiation of solar heat from the interior of a tent or van-hood may be reduced by as much as 85 per cent. by painting the inside of the roof with aluminium paint. A considerable saving of heat from the outer surfaces of hot pipes may be similarly secured.

The dictum that "it would be useful if buildings could be painted black on the outside in winter and white on the outside in summer" is not likely to be acted upon in this country; but the use of white-lead paint for the outside of tropical roofs in hot weather is of much value, particularly if a "chuppar" of white canvas be used which has been also painted with aluminium paint on its under surface.

P. S. LELEAN.

Reprinted from "Bulletin of Hygiene," Vol. 2, No. 12.

NICOL, E. W. L. **The Case for Gas Coke.** *Domestic Engineering.* 1927, v, 47, 97-9.

Mr. Nicol makes full use of the results of official tests of the relative values of coke and Welsh coal for heating water in the boilers of the low-pressure central-heating system of the new County Hall, London.

The outcome of the test, lasting a fortnight for each type of fuel, was that the coke proved superior to the extent of 1.5 per cent. higher thermal efficiency; 12.8 per cent. less cost; much greater radiant heat ratio, as indicated by a difference in the temperature of the flue-gases amounting at times to over 400° F.; and an undetermined saving of cleaning expenses owing to the coke producing no soot.

Mr. Nicol claims that coke is the only fuel meeting the following requisites for central-heating purposes—economy, capacity to burn when banked for long periods (Saturday to Monday), low volatile content, high radiant heat, and small tendency to foul the flues or heating-surfaces.

The results of this practical test certainly appear to support the view of the Fuel Research Board that "Coke gives more radiant heat than coal of higher calorific value."

P. S. LELEAN.

Reprinted from "Bulletin of Hygiene," Vol. 2, No. 12.

SAYERS, R. R. and DAVENPORT, S. J. **Review of Literature on the Physiological Effects of Abnormal Temperatures and Humidities.** *Pub. Health Rep.* Wash. 1927, v. 42, 933-96, 1 fig. [139 refs.]

This very valuable compendium of information would have been far more useful had a little more trouble been taken to tabulate its data. While rather a work of reference than of interest to the general reader, the latter might find value in the 16 propositions summarized at p. 987, of which the most striking appear to be capable of further condensation thus:—

1. As regards temperatures (all in °F.)—the following are fatal to mammals:—Body temperature under 78·8 or over 113; atmospheric over 91·5 in still, saturated air, when a progressive rise begins which is fatal if unrelieved.

2. Reversals of the usual effects occur when: below zero the drier the air the less it cools the body; above 98, the greater the velocity of saturated air, the more it warms the body.

3. The pulse-rate rather than body-heat is the best gauge of comfort, as connoting the physiological attempt to get more blood through the cooling zone of skin capillaries. There occur—discomfort at 135, distress at 160.

3. The following might have been completed and tabulated with advantage:—

	<i>Dry bulb.</i>	<i>Relative humidity. per cent.</i>
Upper limits for hard work...	{ 100 at 30 90 at 100	
Optima—For work, 59·5; for rest, 66.		

4. Normal clothing halves the cooling effect of wind at “ordinary humidity.” In still, saturated air at 60 hard work involves stripping to the waist for comfort.

5. Accidents varied in average frequency in relation to temperatures thus:—

Over 75	= increase of 39 per cent.
Between 65 and 69	= minimum, gradually increasing, with rise or fall of T.
Between 50 and 54	= increase of 35 per cent.

Perhaps the best feature, however, is the section explanatory of the use of “Effective Temperature” as a gauge of air conditions *re* ventilation; the “effective temperature” being that temperature between the dry-bulb and wet-bulb readings at which the greatest comfort is experienced under correlated variations of relative humidity and air velocity. [The credit due to American workers for the evolution of this standard and the chart (p. 955) would not be the less readily assigned had a more generous recognition been made of the value of Leonard Hill's work with the

kata thermometer. When it is considered that the "effective temperature" cannot be determined without preliminary determination of dry- and wet-bulb temperatures, air velocity and relative humidity, it is hardly generous to complain that the kata is frail, and awkward in that it needs an external means of heating its fluid.]

P. S. LELEAN.

Reprinted from "Bulletin of Hygiene," Vol. 2, No. 12.

MAYERS, M. R. **The Use of Ozone in the Ventilation of the Automobile Service Station.** *Indust. Hyg. Bull.* New York. 1927, v. 3, 37-8.

The author gives the analysis of motor-car exhaust air as :—

Carbon dioxide ...	...	8.6 per cent.
Carbon monoxide ...	...	6.3 "
Oxygen ...	...	2.3 "
Methane ...	...	0.9 "
Hydrogen ...	...	3.0 "
Nitrogen ...	...	78.6 "

The carbon monoxide increases to 11 per cent. in the exhaust-air of cars under test in garages in hot weather.

Hence 54 per cent. of garage air tested had over the 0.1 per cent. of CO which is regarded as the danger limit in the U.S.A. ; while 69 per cent. of garage-men had CO in their blood, in amounts ranging from 2.3 to 40 per cent. of saturation point, in association with reduction of oxygen from the normal of 19 vol. per cent. to as low as 2.4.

Dizziness, smarting of the eyes, nausea, drowsiness and inco-ordination caused complaints and inefficiency ; but the most marked effect and the predominant cause of stopping work was intense headache.

As an antidote firms have marketed "ozonators" under the erroneous idea that the ozone will oxidize the carbon monoxide to dioxide. The garage-men have, however, found so much reduction of headache to follow use of these "ozonators," that the cause is being investigated. It is provisionally attributed to: (a) psychological effect, and (b) action of ozone in preventing the carbon monoxide from markedly reducing the partial pressure of oxygen in the alveolar air.

P. S. LELEAN.

Reprinted from "Bulletin of Hygiene," Vol. 2, No. 12.

HANCOCK, G. C. **Report on an Outbreak of Illness at Poplar suspected to be due to Local Pollution of the Water Supply.** *Ministry of Health. Reports on Pub. Health and Med. Subjects.* No. 41. 15 pp. 2 plans and 9 tables. 1927. London: H.M.S.O. [9d.]

On Sunday afternoon, July 11th, 1926, an outbreak of illness characterized by diarrhoea and sickness was reported to the M.O.H. for

Poplar; it was suggested that food poisoning was the cause. This view was not supported by extended investigation of abundant pathological material; the biological results proved inconclusive.

"The clinical symptoms presented by the sufferers were remarkably similar, but differed in some respects from those usually associated with food poisoning; thus, the onset was sudden, prodromal symptoms being often absent. Vomiting, although commonly present, was much less pronounced than the diarrhoea, which in every case was constant and severe. Fever was invariably present, the temperature ranging from 100° F. to 104° F. and the pulse from 120 to 170. Nervous symptoms manifested by convulsions or fits, not wholly confined to young children, heralded the attack in some cases.

"Generally speaking, the symptoms were very alarming at the onset, but for the most part subsided in 24 hours, leaving the patient weak and collapsed. After the attack herpes commonly appeared about the mouth and lips, and many of the sufferers developed ulcers in the mouth.

"All ages were affected, and the incidence of attack was mainly on women and children."

The cases occurred in a triangular area bounded by the Leven Road, fronting the Poplar Gas Works, the East India Dock Road and Brunswick Road, the density of the attack being greatest in Leven Road and diminishing with distance from this line. Records of the Water Examination Department of the Metropolitan Water Board indicated that while the water was not at its best at the time, there was nothing which had given rise to anxiety and, further, while a large area was served with the same supply, nevertheless the attack was quite local. Samples of water taken from houses in the affected area proved unsatisfactory. Further investigation brought to light the presence of cross-connexions, in Leven Road, between the Gas Works' private supply of water, obtained from a deep well and the River Lea which is heavily polluted at the point, and the public mains. Though a back flow would seem *a priori* improbable, still it was conceivable, and some support for the theory was directly forthcoming from the fact that the chlorine content of the water in the main in Leven Road was slightly higher than would be expected. Infiltration of sewage was excluded, as the small night flow showed that the mains were not leaking and there had been no reduction of pressure preceding the outbreak. Non-return valves have been installed and other changes made in the arrangements which will preclude any possibility of a back flow for the future. [With reference to cross-connexions—see this *Bulletin*, v. 1, 880].

GUY T. P. TATHAM.

Reprinted from "*Bulletin of Hygiene*," Vol. 2, No. 12.

Reviews.

REMINISCENCES OF A NAVAL SURGEON. By Surgeon Rear-Admiral T. T. Jeans, C.M.G. London: Sampson Low, Marston and Co., Ltd. Pp. 304. Price 18s. net.

Surgeon Rear-Admiral Jeans served in the Royal Navy for thirty-four years. Sea service took him to many parts of the world while trouble was about and he saw much of war. In his reminiscences he describes his varied experiences: Port Arthur, Manila, the South African War, a Revolution in Venezuela, the Russo-Japanese War, and the Great War. Truly a long and interesting record. And he tells his story well.

The charms of the silent sister service, its attractions and the wonderful spirit that animates it, stand out in bold relief through the pages of the book. It is full of anecdotes, and holds many a good story; it speaks of an interesting, useful life; it contains much sound reflection. The Surgeon Rear Admiral kept his eyes and ears open and his fountain pen was never dry—even in the Persian Gulf. Added to this he obviously thought a great deal. So his reminiscences vary from serious topics to light, from gunnery to torpedoes, *shikar* to surgery, Suvla to Scapa; but they are unvaried in interest, for they are never dull.

Unintentionally, the character of the author seems to be depicted in his pages. Most of those who are reminiscent on paper put their portraits in position as a frontispiece. Not so the Surgeon Rear-Admiral. There is a portrait, not of himself but of one of his captains for whom he cherishes a just admiration. When retirement for age comes upon him, he regrets having to give up when working at his highest professional form. He glories in the opportunity of an emergency operation. On one commission he "yanked out" appendices in Colombo, Muscat, Cape Verde Islands and the Indian Ocean. And he ends his book with, "Certainly, if I had my life to live again, I should retread my steps." Thus the reader can envisage the mental make-up of the author and appreciate some unconscious sidelights on character and outlook. Verily they illuminate the true spirit of our opposite numbers afloat.

M. B. H. R.

RHEUMATIC DISEASES. By Matthew Burrow Ray, D.S.O., M.D., 1926. Pp. 91. Price 2s. 6d.

DERMATOLOGICAL NEUROSES. By W. J. O'Donovan, O.B.E., M.D., M.R.C.P. 1927. Pp. 99. Price 2s. 6d.

DIAGNOSIS AND SPIRITUAL HEALING. By F. G. Crookshank, M.D. Lond., F.R.C.P. 1927. Pp. 101. Price 2s. 6d.

IDIOSYNCRASIES. By Sir Humphry Rolleston, Bart., K.C.B., F.R.C.P., 1927. Pp. 119. Price 2s. 6d. London: Kegan Paul, Trench, Trübner and Co.

These four books belong to the Medical Series of "Psyche Miniatures" and are published in connexion with *Psyche*, the well-known quarterly journal of general and applied Psychology.

They each approach their subjects from the psychological point of view, are interesting and easy to read, are not in the least dogmatic, and each will be found to present its subject in an unusual and unexpected light which we may find helpful.

The author of "Rheumatic Diseases" states that its inclusion in the series of "Psyche Miniatures" only requires justification in the eyes of those who look to bacteriological findings for a complete explanation of the ætiology of these conditions, whereas there are other agencies at work, such as the interaction between the individual and his environment, resulting in a failure of adaptation, or an improperly balanced endocrine system. He passes to a consideration of the different types of rheumatic diseases and indicates those types in which psychotherapy has a particularly useful bearing. The book is very readable and the treatment of each of the diseases is tersely but completely given.

The author of "Dermatological Neuroses" shows how the psychological element in disease permeates and to some extent governs the practice of dermatological medicine. The book contains many illustrative cases which bear out the author's points and shows that the psychological aspect of skin diseases is important for the special physician, and its consideration is of benefit to many patients.

The book entitled "Diagnosis and Spiritual Healing" contains two addresses. "The Theory of Diagnosis," and "Spiritual Healing and Medical Theory." "The Theory of Diagnosis" is the Bradshaw Lecture given before The Royal College of Physicians, London, in November, 1926. Part I has four chapters headed: (1) Medicine and Philosophy. (2) Diagnosis—The Name. (3) Diagnosis—The Explanations. (4) Diagnosis—The Process. Part II, Chapter I, deals with the controversy between Coan and Cnidian in fifth century before Christ. Chapter II, the rivalry between Hippocratists and Galenists in the sixteenth century. Chapter III, the schism which exists between the clinician and the systematizer, showing that we must define the concepts with which we think. Chapter IV is called Compromise and Reconciliation and concludes by summing up that "the best diagnosis that we can attain is that which, when we have observed accurately, interpreted adequately and symbolized correctly, best satisfies the intellectual and affective tendencies and enables the physician to do what is right, and to constrain to his will, not only the patient, but the attendants and the circumstances." Absolute diagnosis is not within our physical application and is a function of omniscience alone. A list of books and papers follows.

The second paper, "Spiritual Healing and Medical Theory," is in lighter vein, but to show the toleration with which the subject is dealt the author's conclusion is appended. "And I do know this, that the most truly great physicians and surgeons it has been my fortune to meet have been the least inclined to deal with such problems as these in any but the broadest spirit of scientific and religious tolerance."

This little volume is very strongly recommended.

"Idiosyncrasies," as Sir Humphry Rolleston states, are abnormal reactions which do not necessarily dispose to disease and have been divided into :—

- (1) Psychological : those concerned with the mind.
- (2) Physical or physiological : those concerned with the body.

The two groups are considered separately, and are followed by chapters on food, drugs, asthma, hay fever, and other allergic diseases. Many of these idiosyncrasies, or abnormal reactions in otherwise normal people, are of practical importance in medicine, especially when they may be due to food or drugs, but mental idiosyncrasies are also important in medicine, as in our daily life, when we see the unreasoning character of personal antipathies, though these may be only expressed in shades of manner. As the author states, such unreasoning personal antipathy was well expressed in Martial's famous epigram (I, 32) :—

"Non amo te, Sabidi, nec possum dicere quare.
Hoc tantum possum dicere, non amo te,"

which was translated by Tom Brown, an unruly undergraduate at Oxford, when "hailed" by the Dean, Dr. John Fell (1625-1686) :

"I do not like you, Dr. Fell,
The reason why I cannot tell ;
But this I know, and know full well,
I do not like you, Dr. Fell."

This little volume is also strongly recommended.

W. L. W.

A SYNOPSIS OF PHYSIOLOGY. By A. Rendle Short and C. I. Ham.
Bristol : John Wright and Sons, Ltd. 1927. Pp. 258. Price 10s. 6d.

In the preface the authors state that the object of this book is to give a fairly full summary of modern physiology. They claim that it will suffice to meet the needs of the student who is preparing for either the ordinary pass examination or the higher examinations, such as the primary F.R.C.S., and at the same time be of use to practitioners who may wish to keep themselves abreast of modern physiology. The book is a fairly up-to-date exposition of physiology, but it is so condensed as to make it uninteresting to read. Thus surgical shock is dealt with in a few lines, and no attempt is made to distinguish between primary and secondary shock. To the subject of vitamins there is only allotted a page and a half. In dealing with the reaction of the blood, acidosis is described, but no mention is made of the condition of alkalæmia which results from the too rapid elimination of carbon dioxide from the blood. The chapter on "Metabolism" is good, but it is a pity that none of the theories which have been put forward to explain the action of insulin in carbohydrate metabolism is discussed. It is likewise regrettable that a little more space is not devoted to basal metabolism, which is disposed of in a short paragraph. The chapters on the "Nervous System" and the "Special Senses,"

appear to contain all that is necessary from an examination point of view. On the whole, the book is good, but it is essentially a "cram book," and is not one which can be recommended to the junior student. On the other hand, to the student who has a sound basic knowledge of physiology it can be commended for revision purposes.

D. McK.

MOSQUITO SURVEYS: A HANDBOOK FOR ANTI-MALARIAL AND ANTI-MOSQUITO FIELD WORKERS. By Malcolm E. Macgregor. Baillière, Tindall and Cox. 1927. Pp. 282. Price 15s.

This handbook consists of three parts. In Part I the author, assuming that his readers lack previous entomological training, gives a complete and clear description of the external and internal anatomy of mosquitoes, including the structure of the genitalia. Part II consists mainly of an account of the distinguishing characters and special bionomics of the mosquitoes known to occur in Mauritius and Rodriguez; although this section may not always be directly serviceable to workers elsewhere, it can be taken as typifying the nature and scope of the exact records necessary in studies of the kind. Part III will probably prove the most generally helpful portion of this essentially practical handbook, for here is set out in great detail everything requisite for the complete field entomologist—the apparatus and equipment of the laboratory, the technique of mounting and dissecting mosquitoes, and the methods of collecting, rearing and keeping mosquitoes in captivity—information all the more valuable, as it is based on the author's expert knowledge acquired and tested in many lands.

Too often medical sanitarians concerned in antimosquito work find themselves sorely handicapped by the lack of a guide over the great gulf between the necessarily elementary instruction they have received, and the highly technical monographs which assume wide previous knowledge on the part of their readers. Those who have suffered thus will find in this volume the essential information they require.

Correspondence.

LIAISON.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—In his letter that appeared in your January number, Lieutenant-Colonel Reed rightly points out that two people are as necessary to a liaison as to a quarrel. I would ask you to believe that it is with the object of establishing the former and not of fomenting the latter that I venture to submit the following remarks with reference to certain statements contained in his letter.

It is not quite clear to me to what extent Colonel Reed considers satis-

factory liaison to have been lacking during the Great War. But the conditions which he suggests existed in 1914 point to the opinion that in the early phases of the war the situation as regards liaison between combatant and medical officers was not altogether satisfactory.

Now, very early in the war I, involuntarily, gained acquaintance with the *via dolorosa* that led back through the various échelons of the medical organizations in the field, and, during the twelve months that followed, the Germans, doubtless feeling with Colonel Reed that I was in need of further lessons in the intricacies of evacuation, were at some pains to provide me with this instruction at irregular intervals. Such experience for one in my position as a junior regimental commander was not uncommon. Though I do not suggest that those who travelled by the same road were, on the occasion of their journey, keenly interested in the details of the machinery that conveyed them to their destination, there can have been none that was not, equally with myself, impressed by the remarkable efficiency of the services that contributed to their comfort. From Colonel Reed's own argument must not one, then, conclude that good liaison was a contributory factor to the smooth working of evacuation for which we remain grateful? For he claims that without good liaison "chaos and delay are inevitable."

As to the later phases of the war: When I had slightly removed myself from the immediate attention of my German instructors, my personal experience was that the closest liaison existed between infantry brigade and divisional staffs and the officer commanding A.D.S. and the A.D.M.S. With the latter, moreover, there was personal liaison with the general staff as well as with A and Q.

No system is so good that it cannot be better. But I think it can be fairly said that in no army in the war were the medical services so completely efficient as in the British Army on the western front. (In claiming this I must confess that I have not had the advantage of reading Colonel Garbowski's article, quoted by Colonel Reed.)

But that is all of the past. It is the present situation that matters. And it is with regard to this that Colonel Reed is frankly, and I venture to think, unreasonably, pessimistic. Here, again, I can speak only from personal knowledge and experience. But the facts I give may serve to modify the views expressed by your correspondent. For over two years I have had the privilege of instructing at the Senior Officers' School. During the three months' course, we carry out several demonstrations and numerous exercises, some purely administrative, the greater number tactical. In all of these the medical services are thoroughly dealt with. The situations of R.A.P. and A.D.S. are decided, and the most favourable positions to be taken up by medical officers serving the various units and formations on the march form subjects for discussion. This has been the custom during the whole period that I have been at the S.O.S., but at every course during the last year we have had the additional benefit of the

views of an officer student of the R.A.M.C. At the S.O.S. a student omits medical arrangements from an operation order at his peril.

This should, at least, ensure that the hundred or so field officers ~~that~~ pass yearly through the school have a satisfactory knowledge of the medical services, and a due regard for the necessity for imparting this knowledge to their subordinates. But, beyond this, I have not found in officers, on their arrival at the school, that abysmal ignorance that has come within the unfortunate experience of Colonel Reed. For instance, out of operation orders for a battalion attack written by twelve officers on the first day of the present course and without any instructions, eleven established a R.A.P. One only, an artillery officer, established a "Field Dressing Station." The sites selected for the R.A.P.'s showed a proper appreciation of the purpose which they were to serve—so did the "F.D.S."

Finally, as to manœuvres: In training troops in the field one simply cannot give the bullet its due. One can only read it an apology at the conference at the end of the day. If the bullet's stopping power were accepted, the troops would spend hours doing nothing but lie on their stomachs. One cannot waste the taxpayers' money by employing "highly paid" officers in training men to the performance of so simple a feat. And so, also, with the material necessary to train the stretcher-bearer and fill the R.A.P. and A.D.S. Nothing so delights the private soldier as to be declared a casualty, to groan and "get done up" by his comrade. But, if in an attack practice one detailed casualties suitable to the occasion, 50 per cent of the men would be learning little else than how best to "feature" the wounded by appropriate gurgles and death rattles. With troops, and without the bullets to lay them out, officers are, naturally, taken up with instruction. This fact may tend to suggest that the care of the wounded and the manner of their disposal are considered less than is actually the case. Instruction of officers in the system of evacuating casualties, and in the liaison with medical officers necessary to evacuation being efficiently carried out, can be more profitably given by tactical exercises without troops—leaving the groans and gurgles to the Royal Tournament at Olympia.

I apologize for having written on this matter at such length, and in so personal a strain, but I am anxious that it should be realized that the necessity for close liaison between combatant and medical officers is, perhaps, more fully appreciated by the former than some of the latter may have been persuaded to believe.

Senior Officers' School,
Sheerness.
January, 1928.

I am, &c.
H. R. SANDILANDS,
Colonel.

Notices.

EDITORIAL NOTICES.

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Original Communications.

MEDICAL TACTICS AND PRACTICAL HINTS¹.

By A D.A.D.M.S., 1914-16.

I TAKE the heading of this lecture to mean the disposition and work of the Medical Services of the Army. To use the word "tactics" implies that the medical units must be mobile, so that I propose to confine my remarks to the use of the medical units of a division. I do not intend to enter into the details of the composition of regimental medical personnel or of a field ambulance or a cavalry field ambulance. All such information is given in war establishments, as you are very well aware, but I must remind you that for a medical staff officer, a D.A.D.M.S., it is always of the greatest use to carry a note-book giving the details extracted from war establishments for these medical units, so that you can answer questions suddenly asked at times by "G" or "Q" staff at the most unexpected places and the most unexpected times when books are not available. I well remember being suddenly asked by a distracted, though outwardly cool and collected, A. A. and Q.M.G. to give him the personnel, horses and vehicles making up a field ambulance, which he had completely forgotten to add to his entraining return at the time when the British Army was moving from the Aisne round to the defence of the Channel ports and the attempt to turn the German right wing. Luckily I was able to whip out my note-book and spout them out; result—staff impressed by the efficiency of the medical staff, and medical staff left with a feeling that there is more in the sayings of the gifted writer of "*Æsculapius Armaque*" than we thought of in 1914!

¹ Lecture given to R.A.M.C. officers during the course of "Winter Training."

Before going further, may I ask my listeners to bear with me if I digress at any time into side issues which may occur to me? I shall commence with the regimental medical establishments and the three field ambulances. To my mind the regimental M.O. and the stretcher bearers form the spear-head and the most important part of the whole medical scheme of evacuation; therefore as an A.D.M.S or D.A.D.M.S. always make it your business to start the working of your tactics by establishing intimate and personal acquaintance with your M.O.'s of the fighting troops, avoid all detached office methods, see the M.O.'s, the O.C.'s and adjutants of units as often as possible, know where they are at all times and know them personally, do not go wandering into the "G" office to ask where are the 2nd Royal Blankshires of the Xth Infantry Brigade; go straight to Brigade Headquarters for your information. Get to know the Brigade commanders and their staff officers, visit Brigade Headquarters frequently until they know that they will often see you and can discuss matters with you personally; be in a position to walk into Brigade Headquarters or Battalion Headquarters at any time as one known as a friend and a helper, and you will find your general usefulness in the Division is greatly increased, and that your knowledge of the position and situation of divisional units is as good as that of the "G" staff and better than that of "Q" who have to stick more to their offices.

Another small "tip" I learnt from an "opposite number" in France was to have in your pocket a map showing the position of units day by day; in this way you will perhaps avoid making a troublesome journey to see a battalion, only to find they have shifted back into reserve some days before. I am talking now of trench warfare, perhaps, according to modern ideas, now extinct. I wonder? But the tip also applies to war of movement just the same; it is so hopeless to find that one is out of touch with units and has to keep worrying a worried staff with endless questions. I may remind you that the general staff have no time to keep telling you things, you must find out for yourself what is going on, and the way to do that is to move about. I remember our present D.D.M.S. once telling me that he made a point of "seeing some unit, however small. every day," and a good point, too.

The field ambulances have their own O.C.'s who are senior regular officers, and may with confidence be left to run their own shows, but the regimental M.O. may be a newly joined R.A.M.C. subaltern or a temporary officer plucked from his private practice to serve his country, and such officers want help from their own people and appreciate it. Another instance of the usefulness of a personal knowledge of unit commanders comes in when you are suddenly called upon to replace a regimental medical officer who has been killed or who has disappeared down the line, wounded or sick, before you have even heard of the casualty, your first intimation being a telephone message from brigade asking for a relief. Then, if you know the unit and its O.C., you can confidently pick the man you want

from the staff of a disgruntled field ambulance commander. To pick up your man from the field ambulance in your staff car, take him to the battalion transport lines and send him up that night with the rations (fixed warfare again) or to deliver him personally by car if possible, is good work and gives the unit confidence in the medical administration. Human nature being what it is, there is nothing a fighting unit likes less than to find itself without medical help on the spot. The unit M.O.'s and their capabilities being known, you have next to consider your field ambulances; there will be no trouble here provided you have good O.C.'s, but lay yourself out to do all you can for their comfort in every way. In a war of movement the field ambulance must billet or bivouac somewhere; my own experience was that in such cases if you push on with the "Q" people of the divisional staff you can frequently find means to pick the best places for your field ambulances by being on the spot. You will probably meet the brigade staff looking for billets or sites at the same time, and if you know what is going on you may often make better arrangements than the brigade can make with the help of your "Q" people. This is a small matter, but it bulked largely in the Great War, where once installed in a certain billet might mean staying there for unexpectedly long periods, and being in a bad site meant great difficulty in getting out of it, as all other places available were fixed up by the time the O.C. field ambulance began to find out what a rotten place he was in. Knowing our field ambulances from O.C. to personnel we should now have a working knowledge of the divisional medical establishments from front to rear, and can confidently await developments from the staff concerning future movements, but we must keep up our routine visits up and down the division. A small digression. I once visited the headquarters of a newly arrived Canadian division and was in the A.D.M.S.'s office when the G.S.O.1 and the A.Q. of the division dropped in. An attack was imminent and they wanted to know what the medical arrangements were: one example of the somewhat casual way things were done in the early days of the Great War. Anyhow the A.D.M.S. was not at all put out, though one could see it was the first he had heard of an attack and was a bit in the air about the whole thing. He asked what brigade was going in and was told; he then replied with force and decision, "Lieutenant-Colonel John R—— commands the field ambulance which will clear the casualties from that sector. I know him and I expect him to make good; if he doesn't make good," and here he thumped the table, "I step in and straighten it out." The staff retired fully satisfied, and I have no doubt that John R—— made good or was straightened out. You will very soon sense what is happening at a division headquarters. There are times of comparative peace and moments of intense activity, which at once display themselves by much going to and fro in "G" office, brigade commanders dropping in and "Q" getting very active in everything from horse-shoes to big gun ammunition. The plan is developing, attack or retreat, or whatever it may be. Then comes the time of conference where

you come in; you get the operation order and you are left to make your own medical arrangements to fit in. F.S. Regs., Part II, tell us: "The field ambulances of a division will operate on the areas allotted to them according to the arrangements made by the A.D.M.S. Their first duty is to establish touch by means of their bearer divisions with the regimental medical services of the units in the area assigned to them."

The A.D.M.S. sits down and considers the plans and information given him by the staff and works out his scheme. He must decide whether he intends to work with one, two, or all of the field ambulances, but before he does anything if he has the time his first job is to cover the country in which the show is coming off. If he has not the time, his knowledge of his regimental aid-posts, his A.D.S.'s and M.D.S.'s will help to save him. If he *does not* know about them, in an emergency he must fall back on the plan of our Canadian friend and leave some O.C. field ambulance on the spot to "make good," and get in touch with him as soon as he can. Emergencies arise without warning in warfare. One night in 1914, I was turning in about 12.30 a.m. when I heard a D.R.L.S. man drawing up outside the billet—our office had been temporarily established in the passage of a house that same afternoon and I was going to bed upstairs. The message came from the O.C. of a field ambulance which had been in action that day and I had visited their dressing station that morning. The message said: "Brigade says we must evacuate all casualties at once and prepare to move, as a counter attack indicates Brigade will retire" (first battle of Ypres, 1914). Motor ambulance convoys did not yet exist; we had two motor ambulances kept at Divisional Headquarters and loaned out when required. The message went on to give the number of casualties, much in excess of their own means of transport. What was to be done? A field ambulance had just arrived that evening and was parked and bivouacking in a school. I made for them and told them to open up at once, I hurried to the "Q" office to verify the news of a possible retirement. I found the "Q" staff packed and ready and the Divisional baggage being loaded up. "Q" said: "I wait for the guns to come back and then I go." I told him of "X" Brigade casualties and the field ambulance and asked for help from the Divisional train. Immediate instructions were sent out to O.C. train to send all available help to evacuate wounded to the now opened or opening field ambulance, and I pushed off with the two motor ambulances. As we approached the distressed field ambulance we met sundry soldiers coming back who took good care to inform us that the "Boches were coming on in thousands." Anyhow we cleared out the overcrowded field ambulance and left them in a position to move back when ordered. The position stabilized itself and nothing happened. This story must be of little interest to those here who took part in the great 1918 retirement, but it indicates the complications that may arise at any time in any kind of warfare, and is only mentioned to illustrate the advantage of "contact" between medical staff and medical units. If I had not happened to know

exactly where the field ambulance was situated and all about it, I should probably have had delay in fixing up arrangements.

To return to our affairs; the A.D.M.S., and his D.A.D.M.S., go over the ground sited for the attack, visit Brigade Headquarters first to find out their ideas, which may amplify the bare facts laid down by the Divisional staff; they next see the M.O.'s of units and the position and state of the regimental aid-posts. You should lay out in your mind's eye where you think of having the A.D.S., W.W.C.P. and M.D.S. that you intend to function; you should have the O.C. field ambulance with you in each sector you visit, and think of the carry for the regimental stretcher-bearers and discuss with O.C. field ambulance what assistance he can give to the regimental medical establishments. Should you decide to reinforce the regimental people with R.A.M.C. bearers, see that they are taken over the ground *before* the show comes off so that they know the lie of the land. Discuss with M.O.'s of units the best means of increasing accommodation and strengthening of R.A.P.'s, going into the question of extra blankets, stretchers, dressings, etc., for R.A.P.'s; you should find out battalion ideas of possible positions for forward R.A.P.'s in case the attack goes according to plan and see that O.C. field ambulance is cognizant of these and can be prepared to bring up his A.D.S.'s to replace R.A.P.'s that go forward. Much has been written about having a liaison officer from the field ambulance with Brigade Headquarters, and there is much to be said for it. I think the O.C. field ambulance is the best man for the job; he is at the fountain head of information and can act quickly.

Next devote your time to a full consideration of what medical units will function and what you will keep in reserve, banking on having a solid reserve of bearers ready in the unused field ambulance for emergency in case you are driven to reinforce. If you can do it, keep one field ambulance in total reserve with the two companies ready for action. Settle the position of your A.D.S. and W.W.C.P.; and, if you have time, put in all the work you can in sand-bagging the A.D.S., increasing its accommodation and making good "get aways" for motor ambulances, if you can get them up. Make extra "dumps" of dressings, blankets, stretchers, etc. Get your provost marshal to co-operate in the marking out and policing of "direction ways" for walking wounded, remembering that a "walking wounded" man always goes back the way he has come up, and makes for the town or village, or whatever it may be he last saw on his way to the front line. Consider the question of evacuation from the W.W.C.P., as all cases will be "sitting." Relays of lorries, fitted on the bus principle of seating, act well, or G.S. wagons suitably arranged for "sitting" cases; save your motor ambulances for more seriously wounded men. Also think out the evacuation of "gas" cases; the policy of one special A.D.S. for "gassed" cases may be possible, but personally I found that they came down with the ruck, and could only be sorted out at the M.D.S. Anyhow, by previous instructions to regimental M.O.'s and A.D.S.'s avert "gas

panic ; " many men who have been through it are inclined to accept the " gas " wound at an early stage, and get back towards the country of peace and quiet, named " Blighty," far from the stress and turmoil of war, and it is extraordinarily difficult to distinguish between the true " gassed " and the man who reports having had a " touch of gas " that makes him cough violently at the near approach of a medical officer. Try and establish a secondary path of evacuation from your front line, if possible ; do not be bound to one channel or mode of evacuation. Circumstances may arise to block a single road with ammunition transport and supply transport ; men must be fed, and shells must come up before the wounded come down ; also the enemy may so barrage a road as to make it useless. So having made your plans prepare the R.A.M.C. operation orders and submit them to the staff for approval. Do not be depressed if the staff at once inform you that certain places you have arranged for the A.D.S.'s, W.W.C.P.'s, etc., have been previously ear-marked for gun positions, etc., and your work has to be done over again. The primary object is to win the battle, and everything must give way to the strategic situation. But all will be arranged eventually, and your operation orders will be passed and issued to O.C.'s field ambulances, brigades, and all concerned.

One word of warning with regard to orders ; at manœuvres I have been asked by the staff before an encounter battle in open warfare to site the position of A.D.S.'s, and I have refused to do so, pointing out that the O.C. field ambulance is the man to do that and to notify me his map reference ; the situation moves too quickly for an A.D.M.S. to attempt to tie down an O.C. field ambulance to a spot site. In actual practice I saw this done at Army manœuvres in the north of India ; the result was that on visiting the field ambulances of the " red force " with the D.D.M.S. during the battle, we found A.D.S.'s fixed down to the map references given them, and the troops they were supposed to be helping were right away off in the blue miles away and clean out of touch. Also do not fix yourself down to any such statements as " A.D.S.'s will be situated 1,000 yards behind the front line." I believe it is a dictum laid down in one of the " War Manuals," and it so obsessed the mind of a junior officer at a staff exercise I was on, that when the G.O.C. asked him, as O.C. field ambulance and having gone over the ground and seen the position of our troops and the enemy, where he would put his A.D.S., he replied at once : " I would site my A.D.S. 1,000 miles behind the front line." In his nervousness at being questioned before a crowd of other officers, he confused yards with miles. The G.O.C. only said : " Rather too far back, Captain Smith ? "

A word about the use of the divisional motor ambulances. We have the nucleus of a motor convoy of twenty-four cars, eighteen light and six heavy ; in addition, we have twelve horsed ambulances. Before considering dispositions, I think it well to suggest that in practice you will find your M.A. convoy will work further up the line than is laid down in text-

books and the difficulty is to keep them back. Undoubtedly some system of organizing a divisional M.A.C. with intermediate "car posts" is sound, saves time, and keeps up a steady evacuation. Again, to quote "F. S. Regs.": "The main work of clearing the area of operations of the wounded takes place after a battle." No doubt this is true, but any scheme of evacuation should endeavour to work from the *commencement* of the fighting and keep up a steady stream of evacuation. Certain approaches, certain roads are forbidden for use by daylight, but much can be done by "dashes" and by working off to a flank. I have unpleasant recollections of seeing two men brought in four days after an attack that had been a partial success. But in one sector a retirement from some captured German trenches was necessary, and these two men were left behind and took shelter in a bit of the German trench that was left unoccupied between the two re-established lines. On the fourth night the M.O. of the battalion was able to get out to them and have them brought in; a very fine bit of work on his part. They had had a terrible time; in trying to get away, one man was shot through the thigh, and his pal elected to stick it out with him. They found some scraps of food and odds and ends, but water was the difficulty. They suffered frightfully from thirst, and were in a bad way when picked up, though when I saw them next morning in the A.D.S. they were sitting up drinking tea and eating bread and jam, which for some physiological reason was the first thing they asked for. It is horrible for men to be left out wounded, though it is unavoidable at times.

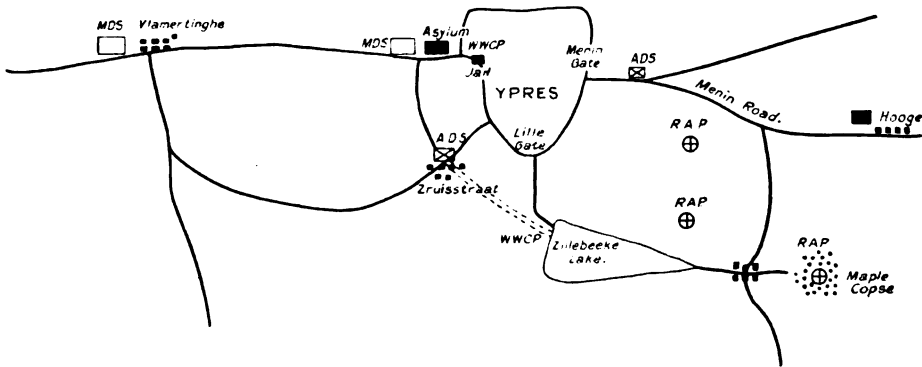
It is the men left out overnight that get missed and lost, consequently our scheme of evacuation should, *if possible*, endeavour to get a steady stream back going as early as possible. Car parks, working on a principle of one car up at the A.D.S. and immediate replacement from the "rank" as the car returns, can get through a lot of work during the day, and one car at a time makes a small mark if the enemy are strafing the road and looking for something to shoot at. I do not know if anyone remembers *the artist* we used to call the "body snatcher" in the Ypres sector; he functioned with the Belgians up on our left, and when he heard a noise going on at Ypres he appeared with a couple of motor ambulance cars. He was an American by accent and a fine plucky fellow, but he had no use for regulations, returns, or red tape of any sort, he simply worked on the principle of dashing off to wherever the fight was going on, pushing his cars up as close to the scrap as he could get, and making off with anyone he found. Ypres suited him down to the ground, as the city was heavily shelled when any fight was on, and day traffic stopped. He used to dash in from the Belgian side and snatch off any odd walking wounded he could find struggling back through "Wipers." He was quite a stout fellow, but too unconventional, and the D.D.M.S. Corps had to prohibit his "body snatching." The trouble was he was quite impartial where he delivered his casualties, and did not at all mind carrying them off to his own establishments right out of our lines. However,

he illustrates what can be done by "dashes." A gallant officer of a field ambulance in my division did the same thing at Ypres during a fight, and worked a single motor ambulance from the asylum up and down the Menin road in daylight and brought in a lot of wounded. The moral is, do what you can so as to lessen the strain when the night comes and much has to be done but is hampered by darkness. It is difficult for motor ambulances to work without lights on the cars, but it was, of course, done night after night for years on the Western front. I think it is good policy to appoint an officer as O.C. Divisional M.A.C. and let him run the show, he is on the spot and can deal quickly with the question of an excessive number of casualties coming in at any one A.D.S. or R.A.P. While on the subject of scope of work of divisional motor ambulances, I think the ruling stands that they clear from A.D.S. to main dressing station, and the M.A.C. from M.D.S. to clearing hospital. In practice I have, and many here to-night have, I am sure, seen divisional M.A.'s clearing direct from R.A.P. to A.D.S. and the M.A.C. from A.D.S. to clearing hospital. Do not neglect the use of your horse-drawn ambulances, they are of incalculable service for working off main roads, and much can be done by the use of wheeled stretchers working along bridle paths and linking up with horsed ambulances at certain arranged positions.

I feel now that I have touched, ever so lightly, on the main points of Divisional medical units as worked during the Great War, but I feel that thought should be concentrated on what we may have to contend with in future wars. Let us, at all events, assume that our next war is fought in non-European territory with all the conditions against trench warfare, and with all the difficulties of a country not possessing good roads, towns and buildings for use as hospital positions and sites, under primitive conditions and in a country practically impossible for wheeled transport once off the few main roads. What will again happen in big cavalry movements? Will the cavalry field ambulances function successfully? I was once the M.O. to a mounted infantry unit in South Africa. I accompanied them on the dash for the relief of Kimberley, an impressive mounted force nearly 8,000 strong; we rode for Kimberley, breaking right through the enemy's resistance, relieved Kimberley, drove off the invading force and turned to head off Kronje at Paardeburg. From start to finish I never heard of a medical unit until we got back to Paardeburg. We had field hospitals whose transport was much the same, bar motor ambulances, as what we have to-day, but they could not compete with a cavalry dash, and were left far behind. Take the North of India, go on manœuvres and see how the medical units are fixed down to the Grand Trunk road. What is the solution? I suppose something in the way of tractors that will cross country impossible for ordinary wheeled transport.

To conclude this lecture, I would like to put before you, from memory, an operation that took place in August—— in the Ypres Sector of the Western front with the medical tactical arrangements as they were

worked out. The casualties were 1,200 during the action, and the result from a tactical point of view was a success. The attack was made by one brigade, the X Infantry Brigade, on Hooze, with a view to recover trenches and positions lost a few days before by a recently arrived new Division. The N Division was shifted south to take over the line of the new division and prepare for the attack, consequently it was new ground to us, and had to be reconnoitred. It was decided to have one M.D.S. in the asylum west of Ypres, and as the attack was being directed from the east and south of Hooze, an A.D.S. was established at Kruisstraat, south-west of Ypres, with an M.D.S. west of Vlamertinghe. An A.D.S. was also sited at the mill on the Menin Road. R.A.P.'s were reconnoitred and established at a point in the trenches south of Menin Road, Zillebeke Lake and in Maple Copse. All R.A.P.'s were strongly reinforced by R.A.M.C. bearers, as it was obvious "carrys" were going to be heavy. Hooze and Maple Copse



are roughly 4,000 yards from Ypres and Kruisstraat. R.A.P.'s were strengthened and extra blankets, stretchers, etc., dumped. The attack started at dawn; the objective was reached, but heavy counter-attacks and shelling all day produced many casualties and some trenches were evacuated as being untenable. Walking wounded were flagged and directed to the jail in Ypres, and to a point north-west of Zillebeke Lake. The system of evacuation depended on carry from R.A.P.'s in north sector to the Mill and from R.A.P.'s in south sector along the protected side, the north side, of the lake to the track running west to Kruisstraat. As Zillebeke was enfiladed by gun-fire from the Messines Ridge, its north bank had been built into a protected breastwork, so that wounded taken through Zillebeke village were fairly happy. From Kruisstraat the divisional horsed ambulances and wheeled stretchers worked across to Zillebeke. The southern sector of evacuation worked well in that, as usual, all the enemy's spite was directed on the Menin Road, Ypres, the Vlamertinghe road and Vlamertinghe itself. All day shelling was very persistent, but many wounded filtered back through Kruisstraat and back through the Lille Gate and Menin Gate to the Asylum and W.W.C.P. All motor

ambulances were busy clearing from the Asylum, Jail and Kruisstraat back to M.D.S. west of Vlamertinghe. It is to be observed that all the southern sector could be dealt with without touching Ypres. Divisional motor ambulances made excellent clearances even during the day by one-car trips from the Jail and Asylum out to the Mill and Menin Road, but it was very unhealthy. As it grew dark the M.A.C. commenced working up to the Asylum and to Kruisstraat, while Divisional cars worked out to the Mill and even south to Zillebeke village, as Maple Copse was full of wounded—in fact, all available motor transport was required to keep clearing right from the Maple Copse sector north to Menin Road and west through Ypres. "Clear" was reported at 2 a.m. I think the scheme worked satisfactorily; what it came to was practically every lightly wounded man was got away in daylight, and a considerable number of more serious cases via Kruisstraat and the Mill, and the increased rapidity of transport when the motor ambulances got working farther up cleared all the more seriously wounded. Two M.A.C. drivers were hit during the night work and a couple of ambulances done in. I apologize for putting before you such a small affair as described, but we are much more likely to meet with small battles in the future, and such examples must not be despised for purposes of illustration.

At the discussion following the lecture some very interesting points were made. One officer recognized the regimental M.O. I was referring to when I described the episode of the bringing-in of the two men left out in "no man's land," and said that he had heard the O.C. of the battalion to which Captain J. was attached speak of his influence in his battalion as being worth 400 men to the fighting strength of the unit. What a recognition of the work of a medical officer to the war efficiency of the Army! I add, with sorrow and regret, that the gallant officer alluded to above was killed some time after when still serving as a regimental medical officer. Another officer brought forward the question of the duties of a regimental medical officer. He argued that his duties consisted in first-aid work that could be most efficiently carried out by a well-trained, non-qualified man, that the wastage of war called for the protection from elimination of the specialist, that doctors should be saved for purely medical or surgical work, and not used for duties that could be carried out by stretcher-bearers, that the Royal Navy used medical students in their ships, designated surgeon probationers, and the system worked well, that the Germans in the Great War used N.C.O.'s for such duties as our regimental medical officers carried out, and the doctors were kept further back. I know this question was discussed during the war. I know of one instance, but only one, when a regimental M.O. wrote an official letter pointing out that his duties could be carried out by a N.C.O. of the R.A.M.C., and that he was wasting his time and knowledge as a regimental M.O. Personally, I cannot agree with this view. I have given one instance of the influence wielded by a doctor's personality in war, and there were hundreds, probably thousands of such cases between 1914-18. The British soldier is accustomed to have his

medical officer with him in war, living with him under the same conditions as his regimental officers, sharing his dangers and discomforts. What would he think if he never saw a medical officer until he was sent down the line wounded or sick? How would the O.C. of an infantry battalion like to go on service without a medical officer living with his headquarters wing? What would be the effect on the prestige of the R.A.M.C. if the medical representative with the fighting units was somebody analogous to the sub-assistant surgeon of India in so far as rank, education and general social qualities were concerned? It would be a disaster of the first magnitude. Conditions existing in the German army should not be quoted; after all, the *moral* of the Germans went to pieces and we won the war. May we not say that the absence of doctors from the German front line organizations, if it did occur, helped to lower the *moral* of the troops? The feeling of not getting the best medical attention when wounded would certainly affect the spirits of officers and men. Do we not know that, to speak openly, the soldier's most decided pleasure in getting a "Blighty" was fostered by his certain knowledge that from the moment he was wounded he had the best of medical skill at his disposal? However, the other side exists. War is a stern, iron-hard and bloodily cruel procedure, and the ultimate aim is victory at all costs. Wars *could* be fought without any medical service whatever, the wounded *could* be left to die as they fell, we could even revert to the customs of the Zulu impis, who when marching to battle killed off those who were unable to keep up the pace, and all wounded unable to totter along after a victorious fight were treated in the same way, but there is a slight hope that we may not quite go back to the habits of savage tribes.

The pessimists tell us that the next war will far exceed the Great War in relentless slaughter of man, woman and child, without pity, that whole cities will be ruthlessly sacrificed to force the surrender of a nation, and that human life will be wiped out by the hundred thousand at one fell swoop. If such dire happenings should come to pass we must cope with them as best we may, but history shows that though war becomes more and more destructive of human life, the care and treatment of the wrecks of war improve in each campaign, and the work directed to the amelioration of pain and suffering in war goes on steadily during peace, and I trust that we, as the strongest link in the chain of evacuation of the wounded soldier, may never have our first line weakened by the abolition of the regimental medical officer.

DIARY OF A D.A.D.M.S. ON THE JERUSALEM CAMPAIGN,
PALESTINE, NOVEMBER-DECEMBER, 1917.

BY LIEUTENANT-COLONEL H. F. HUMPHREYS, M.C.

Royal Army Medical Corps (T.A.).

(Continued from p. 183.)

November 25.—We heard this morning that the attack of the 52nd Division on El Jib had failed and with it all hope of reaching the Nablus road for the present. But the 20th Corps were coming up and our job was simply to hold on—the 52nd Division to Nebi Samwil and ourselves to the hills guarding their flank—till the 20th Corps could come up and relieve us. Numbers of men had now to be evacuated sick, chiefly with sore feet, and what with that and the loss of the No. Threes with the horses we were getting very low, and our line was readjusted a bit for economy's sake. Divisional Headquarters moved back to Tahta in the afternoon, leaving Headquarters of the 6th Brigade at Foka. The 8th Brigade joined up our right with the 52nd Division and the 22nd Brigade extended our left covering Tahta. Colonel M. had now brought up his tent section to Tahta and that acted as divisional collecting station, the bearer sections being with their three brigades. We still had to use camels all the way from the front line to Annabeh, but supply limbers returning empty took all the light cases, so we managed all right.

November 26.—At Tahta. The shortage of dressings was now very acute, and the septic sores which formed the bulk of every sick parade had to go undressed. So as there was no prospect of anything doing in the way of active movement the A.D.M.S. got a Ford car and went down to the receiving station at Julis to borrow a few boxes of dressings, while I remained on duty at Divisional Headquarters. It was a quiet day and I explored Tahta village and saw some of the curious olive presses there. I took round one of the interpreters from Divisional Headquarters and through him I talked to the sheik and learned that olives were the main staple of these hill villages, the oil being sold at Jaffa; with their profits the villagers buy the few necessities of life they cannot produce themselves—cotton cloth, metal utensils, &c., and for the rest live a self-contained existence with their flocks and patches of barley. The vines that once covered the hill terraces have now vanished. The olives are dried on the housetops after harvest and all winter the peasants busy themselves with the presses. They are just like cider presses at home, and though you see a few modern ones with steel screws, most might be of any age—rough stone mill wheels for crushing the fruit and the presses made of olive boughs rudely fashioned into screws and levers. The crude oil easily congeals in the cold winter

weather, so the presses are all in cellars underground warmed by braziers, and the grinding wheels are turned sometimes by a donkey, sometimes by a team drawn from the household women and children.

November 27.—The A.D.M.S. returned at 11 o'clock, and I wandered round the hill looking at the rock tombs which are plentiful hereabouts. They were all innocent of inscription and very plain, but I found one typical Roman catacomb of the early "columbarium" type. In the afternoon I borrowed the Padre's Bible and read Joshua. Beit-ur-el-Foka and Beit-ur-el-Tahta were, of course, Beth Horon the Upper and Beth Horon the Lower respectively, and it was easy to see how vital they were to any army trying to advance up the Valley of Ajalon. One realized how important it was that we should hold on there if we were to take Jerusalem in this campaign.

In the afternoon the lull in fighting we had enjoyed for several days was broken by a strong Turkish attack on Zeitoun Hill. It was only about two miles away as the crow flies and I could clearly see the Turks working their way up the rock terraces in small groups. We had a battery up at Foka now which blazed away merrily, and about 5 o'clock the attack died down, but our condition was obviously pretty critical. At the same time it was vital to hang on, as if our line gave way the Turks would come right in behind the 52nd Division and cut the communications of all troops to the south of us. We were holding a ten-mile front with about 1,200 rifles and had no reserves at all to buttress up badly tried places. It seemed impossible we should hold on with such slight forces, but we had a hundred Hotchkiss rifles and three machine-gun squadrons in the line, so that our fire strength was out of all proportion to our numbers and it was magnificent country for defence. Of course a line so thinly held could not be continuous, but was merely a chain of pickets holding all the commanding points, and even so there was a gap of three miles between our left and 54th Division who were holding the country in front of Ludd. The Turks had not yet shown themselves against our left, which was difficult to reach from the Nablus road, but as it turned out they sent a patrol through the gap right to Beit Sirra that night—well behind our lines—and it was our left which was attacked next morning.

I talked to R. (G.S.O. III) after tea and he said the 7th Mounted Brigade were coming up to reinforce us to-morrow afternoon, but the General had sent an urgent message telling them to ride all night and reach us by dawn or they might be too late. Apparently the 20th Corps were not due up for another couple of days or so. Everyone who realized the situation was a bit anxious, and we knew that we stood a good chance of being scuppered next day. The twelve men left of the Escort Troop were sent out to picket the wadi to the south and the opposite hill, as snipers could easily have got through our line in the dark and made business at Divisional Headquarters impossible. To-day we heard that supplies would henceforth come up from Latron to Beir Sirra along the valley of

Ajalon, instead of by the old route from Ramleh *via* Annabeh and Berfilya. So we wired the 22nd Brigade Tent Section through Corps to move from Ramleh to Latron, form a divisional collecting station there and evacuate to Ramleh by the Ford motor ambulance, leaving the 8th Field Ambulance and carts to clear Annabeh. It is always better to clear casualties along the same line that supplies come up, and the road from Latron to Beit Sirra was reported very tolerable. The day's casualties from Zeitoun were expected to reach the 6th Brigade Tent Section at Tanta during the night, and we decided to clear them to Annabeh in the morning by camel and after that to evacuate from Tahta through to the 22nd Brigade Tent Section at Latron, using camels, and from Beit Sirra onwards the sand carts of the 6th and 22nd Brigade Field Ambulances supplemented by empty supply wagons. So we sent out orders to this effect to all concerned and turned in early.

November 28.—When I woke up at 6.30 the expected Turkish attack on Zeitoun was being resumed, and half an hour later while we were having breakfast C. of the 8th Brigade Field Ambulance turned up. He reported having brought down some casualties to Tahta during the night and we sent him back to the 8th Brigade with orders to the bearer section that if, as seemed possible, Zeitoun fell, and it became impossible for them to evacuate back to Tahta, they were to send casualties to the 52nd Division dressing station at Kubeibe till the position became more settled. This plan was actually put into operation the same afternoon after Zeitoun had fallen and we heard nothing more of the 8th Brigade till the Division was withdrawn two days later.

About 7.30 bullets began to fly over from the left, and it was obvious that an attack from that side was beginning. So we sent a message to Colonel M. to move his tent section to Beit Sirra and reopen the divisional collecting station there. The orderly had not gone long when furious firing began on the left; bullets came over like rain and soon we began to get shelled; the second shell laid out Majors H. and P. of the Headquarters Signals, and our mess camel bringing water from the well was killed just as it reached us. I went over to Signals to find out what was happening and heard that the 22nd Brigade was being pushed back and the 7th Mounted Brigade who had just come up were heavily engaged. I suggested to the A.D.M.S. that I should go down and see what was happening and whether the 6th Brigade Tent Section was safely away, so I set out on foot keeping under the lee of the hill for a mile and then going to the top opposite the place where divisional collecting station had been. As soon as I showed up on the top of the hill I drew rifle fire, but I could see that the collecting station had gone, and pushing on I found Colonel G. with some of the 22nd Brigade Bearer Section. Their dressing station had suddenly found itself under machine-gun fire half an hour before and had withdrawn with the loss of most of their horses to the lee side of the hill. Apparently the Turks had rushed the hill by Suffa held by Lincoln Yeomanry, which

had given them command of Tahta valley where supplies, the collecting station, etc., had been. Colonel G. had seen the 6th Brigade Tent Section come under heavy fire as it was marching back to Beit Sirra, and believed they had lost their transport, but that most of the men had got away over the hill. He knew nothing of the 7th Brigade Field Ambulance, though he had seen their regiments arrive and go into action to help the 22nd. I asked him to manhandle his casualties down the hillside to the wadi on the south which I knew led down to Beit Sirra, and I would try and raise transport and send it up the wadi to clear them to Colonel M.'s collecting station.

I wanted to find out if the 7th Brigade Field Ambulance had arrived, and where they were and by great good luck ran into one of their orderlies; he was lying fast asleep amid the racket that was going on, with a dying man beside him, and I woke him up rather roughly, poor devil; he told me they had been marching continuously for a day and a night, and he had taken no food since yesterday morning; the mounted bearers had pushed on with the brigade, leaving the cacolet camels to follow, and they had barely arrived in the Tahta valley when they came under short range machine-gun fire from the captured hill; he had carried this trooper on his back and having got him here under cover had dropped down exhausted and fallen fast asleep. He did not know where the rest of his unit was, but I assumed the bearer section was with the brigade, so I put him in touch with Colonel G. and asked the latter if he came across the 7th Brigade bearer section to pass on my orders for evacuation to them.

I had pricked up my ears at hearing of the 7th Brigade Field Ambulance cacolet camels coming up behind, as they would be invaluable if I could get hold of them, so I decided to walk on to Beit Sirra and get M. to send out scouts and find them. A mile down from the wadi and half a mile on I found Q.M.S. R., of the 6th Brigade Field Ambulance, with Captain C. of the same ambulance badly hit, a bullet through the chest and severe internal hæmorrhage. I did not think he would live more than a few hours, so I dressed his wound, rigged up a bivouac over him, and left him with an orderly and several other casualties that had collected there, with orders that they should all wait till I could get camels up to clear them. I then pushed on to Beit Sirra where I found M. He had had a bad time. He had been on the march to Beit Sirra when the Turks rushed that vital hill and another ten minutes would have seen him in safety. As it was all his transport animals had been shot down at once and his section scattered, while of the three officers with him C. as I had seen was shot through the chest, C. the vet. through the head, while the Padre was lightly wounded and had got away. However, he had got most of his personnel intact and some surgical havresacks, and by dint of borrowing a box of dressings from a 52nd Divisional Ambulance, close by, and medical comforts and petrol tins (for camp kettles) from the supplies here was prepared to run a collecting station of a sort. I took all his cacolet camels and sent them up

the wadi with orders to peddle to and fro and bring back all cases as they were manhandled down to the foot of the hill. But he only had about a dozen, and I wrote orders for the 7th Mounted Brigade camels to rendezvous at Beit Sirra, and sent off one of M.'s men to look for them on the Annabeh-Tahta road and deliver the message. Luckily he found them an hour or so later by El Burj, and that afternoon they too were plying up and down the wadi carrying casualties back to Beit Sirra.

After making the arrangements at Beit Sirra I walked back up the wadi to Tahta to report to the A.D.M.S. Casualties from both the 22nd and the 7th Brigades were coming down the hill and being loaded on to M.'s camels, and the A.D.M.S. and I concluded there was nothing more to be done at present except to wire to Latron to send up the sand carts to Beit Sirra as soon as they arrived from Ramleh with the 22nd Tent Section. In view of the 6th Tent Section at Beit Sirra having lost their equipment, we also wired to the 8th Brigade Tent Section at Annabeh to strike camp as soon as their casualties were cleared and reinforce the 6th at Beit Sirra; finally we wired the D.D.M.S. of the Corps to send us more cacolet camels as we were still uncertain whether the 7th Brigade Field Ambulance would materialize.

It was now afternoon and the Divisional Headquarters was still getting shelled at intervals, while overs from the rifle fire streamed in all the time; they plumped into the General's bivouac with such persistence that it was difficult to believe we were not under direct fire. But the same conditions applied to all the three miles between here and Beit Sirra, and it was not till one got within half a mile of the latter that one was really out of fire. I learned that Zeitoun had fallen at midday and the 6th Brigade were now defending Foka. That meant that contact with the 8th Brigade was lost and their casualties were now going to the 52nd Divisional Dressing Station as arranged. The 6th Brigade Dressing Station were getting cases back from Foka by camels, but about 4 o'clock an appeal came from B. for more camels, and I set off again to see what I could arrange.

Pushing down the wadi I found Colonel G. of the 22nd Brigade, who had got most of his casualties down to Beit Sirra by this time, but was going back as soon as it was dark to collect others reported from the outpost line. He had seen the officer in charge of the 7th Brigade Bearer Section who had done the same, so I collected together a dozen camels coming back from Beit Sirra and sent them up to B. at Foka. Farther on I found that C. had been moved, and pushing on to Beit Sirra I found him there still alive though not expected by M. to last the night. A number of shells had fallen near him in the wadi and the orderly left with him had seized a passing camel and taken him down. M. had about 200 casualties and was working away single-handed, but hot food was going for the patients (boiled in petrol tins) and all was well. I learned that his scout had succeeded in delivering my order to the 7th Mounted Brigade camel convoy, and these after arriving at Beit Sirra had been working up and down

the wadi all afternoon. There was no immediate prospect of evacuating his casualties, but I told him the arrangements we had made and it seemed possible that the sand carts from Latron might arrive in the night.

I had some bully beef and tea with M.; it was now about 7.30, and then set off to walk back to Tahta; on the way I met a string of camels carrying 6th Brigade casualties from Foka, and the orderly in charge told me the Turks were already in the eastern houses of the village when he came away and that desperate hand-to-hand fighting was going on there. This made me anxious as to the fate of B. and T., and the 6th Brigade bearers and I was overjoyed to meet T. with the bearers in the wadi just below Tahta. They had got all casualties away before the village was taken and our line now ran a few hundred yards this side of the village. They were forming another dressing station at Tahta, and I found the Divisional Headquarters in the act of moving back across the wadi to the hill on the south side of it. So I picked up my horses and went with them. About 11 o'clock we reached a small olive grove on the top of the hill there and settled down for the night.

November 29.—About 1 in the morning I was wakened up by an awful crash, followed by a loud tinkle just beside my head. I turned over and went to sleep again, but in the morning found we had been saluted by a salvo from one of our infantry batteries at Beit Sirra, and there was a shell fragment in the mug beside my head. After breakfast I arranged with the A.D.M.S. that I should go to Beit Sirra and see how matters lay at the collecting station, and then make a tour of the Brigade Dressing Stations. I took my horses, as I expected that by this time some sort of a track would have been cleared up the wadi and my feet were very blistered from so much walking over the stony hillsides. At Beit Sirra all was well. Not only the sand carts, but also the Ford motor ambulances had arrived in the night from Latron, and now after several journeys the bulk of his casualties were clear—though many more had come in during the night. Pushing on up the wadi I found the 22nd and 7th Brigade Bearer Sections together with all the men resting; they had cleared the night's casualties to Beit Sirra, and now would have to wait till dark before they could go up to the outpost line again. Here I met Colonel M. of the 7th Brigade Field Ambulance. He had brought his tent section to Latron, and had come up to see how the bearer section was faring. We had not been able to send him any orders, not knowing where he was, so I arranged with him forthwith that his tent section should open side by side with the 22nd at Latron, his sand carts ply between Beit Sirra and Latron, and his Ford motor ambulances between Latron and Ramleh, thus easing the strain on our own transport. At Tahta I found the 6th Brigade bearers also quite happy; they had not had many casualties in the night. Altogether the situation was much easier to-day. A brigade of Australian Light Horse had come up by forced marches, and was helping the 6th Brigade, while the 20th Corps had begun to arrive, and the 52nd Division on relief had sent

over a brigade to strengthen the 7th and 22nd Brigades. So that though our line had given a bit here and there the day before, it was still intact and, reinforced as it was, no longer in any great danger. The Turks, too, must have been exhausted after the furious fighting of the previous day, for firing was much slacker all along our line.

I came back from Tahta to Beit Sirra to see if the 8th Brigade Tent Section or the camels asked for from Corps had arrived. There was no sign of either, but evacuation was still proceeding by sand cart. M. was very worried about his lost equipment, as he had nearly exhausted the dressings borrowed from the 52nd Division. He had already sent up a couple of teams taken from the sand carts to try and save them, but the N.C.O. in command had been stopped by some officer or other on account of the danger. So as it seemed as if there was no more work for me to do that day, I said I would take up a couple of teams as soon as it was dark and see what I could do. I rode back to the Divisional Headquarters first of all to report the day's progress to the A.D.M.S. I found there was some prospect of the whole Division being relieved next morning, as the 20th Corps was arriving in force, so I arranged to spend the night with M. after my salvage operations and await orders. It was now dusk, and I returned to the wadi, picked up the teams and started to climb up the face of the hill. Near the top I left the teams under cover and pushed over the crest to reconnoitre. It took me some time to locate the wagons, but I found them at last with the dead mules lying as they had fallen in their traces. There were a good many stray bullets knocking about, but luckily no Vêry lights, so I walked back and led the teams down to the spot. It did not take long to hook in new teams, but unluckily someone had been at the medical panniers, and the tins were lying all over the ground. However, it was too hot a place to linger in, so we bundled the tins into the limber anyhow and set off. It was all right for half a mile, but we could not take the limbers down the rocky slope into the wadi, and I found after half a mile that the track to Beit Sirra led to the right, and I struck a machine-gun post here who told me the next four hundred yards were pretty unhealthy. We were only three or four hundred yards from the Turkish line here, and they apparently had machine-guns trained on this bit of road. However, we had to push on or abandon our salvaged equipment, so I spaced out the limbers at good intervals, made the men walk on the sheltered side of their horses and set off. The loose tins in the limber made what seemed to me a racket loud enough to set every Turk within miles loosing off, and I expected a Vêry light to go up any minute. However, they either had not got any or did not hear us, and we got safely across suffering nothing worse than some stray rifle fire and a couple of bursts from a machine gun. One man with a bullet through his breeches and a few shots into the limbers were the only damage. Another couple of miles, and I reached Beit Sirra, where I had some supper with Colonel M.

We were both tired and soon turned in ; I found that the camels we

asked Corps to send had arrived an hour before—again too late to be of much use, and after we had solved our difficulties on our own resources; but we were glad to see them, and next morning when we got orders for the Division to go back used them to clear all casualties that remained at Beit Sirra back to Latron. They came from the New Zealand Mounted Brigade Field Ambulance, and I knew the officer-in-charge. The 8th Brigade Tent Section from Annabeh also arrived in the small hours.

November 30.—I woke up at 6 and then we had breakfast. A fair number of casualties had come in during the night, but M., of the 22nd Brigade, had come down to help Colonel M. and had taken on the night spell. We took a walk over to supplies, who told us that the Division had been relieved before dawn and were all on their way to Beit Sirra now. So I sat tight awaiting orders, and about 9 o'clock the A.D.M.S. turned up. The Division was all collected at Beit Sirra by 10 o'clock, without their horses of course, and what with the absence of the horse-holders and transport, and our losses in sick and casualties during the past month, it was a pitiful muster. About 10 o'clock we started off on the march back to Annabeh, Divisional Headquarters leading, and after about a mile we traversed a bit of road which was apparently under observation from the Turks, for they sent over a few dozen shells as a parting shot. One or two men of the 22nd Brigade were hit, and my orderly riding behind me had a shrapnel bullet in his horse's neck from a shell that burst just above us. I expended one of the last of my dressings doing up the wound, and then we pushed on and after a long hot march reached Annabeh in the afternoon. Here we found supplies waiting for us, and I bought some oranges from the villagers and some tibbin for my horses who had been on pure corn throughout the month. It was good to have a restful night again after all we had been through.

December 1.—After breakfast we set out again; horses had come up from Ramleh to mount the weary troopers, and about noon the Divisional Headquarters reached the Zionist village of Akir in the centre of the district where we were to camp for a time. Our troubles were now over and for the next month we were to be busy receiving drafts and re-equipping. The same afternoon a big motor flashed into Akir; it was the Commander-in-Chief who had come personally to thank the General for the work the Division had done. He said that if we had not held the flank during these critical days in the hills, the whole army would have been compelled to give up the hold it had secured on the mountain passes, and that if that had occurred it would have taken three months of hard fighting and thousands of casualties before we should have been able to take Jerusalem.

The direct share of the Division in the Jerusalem campaign was now over, and it remained for the 20th Corps to reap the fruits: there was a pause of a week while supplies and ammunition were got up, and then the attack began. They had only a couple of miles to advance from Nebi Samwil, and the second day they reached the Nablus road and Jerusalem was isolated, and surrendered.

On the whole the A.D.M.S. and I were well satisfied with the way the medical arrangements had worked, and so apparently was the General. We had always seemed to be living from hand to mouth with a breakdown in sight, but it had never come, and every casualty of the campaign had been promptly evacuated except in the case of captured positions like Beitunia and Zeitoun. The resources at our command had been slender and our casualties extremely heavy in proportion, and when we heard later on of the temporary breakdowns that the other divisions had suffered we began to think we might have fared worse.

THE GOD OF BATTLES.

The sullen gun-roll mutters, and the riot
Of battle dies as dusk comes dropping fast
Her veil on hill and valley. All is quiet.
Till the brief night is past.

Now swinging up the eastward slope, Orion,
A bright joy glowing from each jewelled star,
Exults to see the age-long lure of Zion
Lighting the fires of war.

The immortal hunter, looking where his lieges,
Sons of the sword, his ancient weapon wield,
Muses of far-off fights, forgotten sieges,
Set on this fateful field.

Here strode the Assyrian spears, the swart Chaldean
Swarmed up this classic pass, this terraced hill,
And here the hosts of Israel raised their pæan
The day the sun stood still.

Now up the crumbling road that once the Roman
Wrought in the rock, from yet more distant suns,
Drawn by the deathless call, the English yeoman
Hauls grimly on his guns.

What mystic curse decreed that yonder city
Shall down the ages spur men on to strife,
The holy hill-top where the Man of Pity
Preached Love the rule of Life !

Still in man's breast in grapple never-ending
Spirits of love and battle striving meet ;
Christ and Orion for his soul contending
The paradox repeat.

Still must we ride the road our fathers bled on,
By dual nature driven pursue our quest,
Till on yon plain¹ the last great Armageddon
Ends all and man can rest.

H. F. H.

Beth-horen, November 27, 1917.

¹ The plain of Megiddo or Armageddon, a day's ride north of the valley of Ajalon.

THE STORY OF THE BRITISH PHARMACOPŒIA.

BY QUARTERMASTER-SERJEANT E. F. SMITH.

Royal Army Medical Corps.

"But did you suppose that medical science, alone among all sciences had achieved finality and omniscience? We've reached the state of knowing that we don't know, and that's something."—ARNOLD BENNETT, "Mr. Prohack."

THE British Pharmacopœia of to-day would seem to be a book lacking in the slightest degree of romance, yet the history of the influences which brought about its conception is of such absorbing interest and embraces so many periods of the world's history that it would take many volumes to deal with it effectively.

The writer of the present article has made an attempt to bring out the interesting landmarks whereby those who write prescriptions and those who dispense them may have some idea of a few of the men who laboured in the field of pharmacy throughout the ages, and had their influence on the British Pharmacopœia of to-day.

It would be impossible to say that such and such a man invented pharmacy, just as one could not state which individual invented artificial light. Among the sacred books of the Hindus ascribed to Divine origin was the Ayur-Veda, which explained the healing arts. This was in existence at least 1,000 years B.C., and although very little of the original work is left at the present day, it is constantly referred to in the writings of numerous commentators of that period. The ancient Hindus appeared to have a wonderful and accurate knowledge of medicine and pharmacy. Dr. T. A. Wise writes: "It is to the Hindus that we owe the first system of medicine Considering these various circumstances it is impossible to divest oneself of the conviction that there were once communities in Hindostan, possessing eminent scholars who cultivated literature and science by which the Egyptian and Greek philosophers profited." The ancient Egyptians, however, if Pliny is to be believed, were the originators of the application of medicine to disease. The Ebers' "Papyrus" is said to be one of the earliest pharmacopœias in existence. Its date is presumed to be *circa* 1552 B.C. It has been translated, and several drugs at present in use, including opium, squill, and castor oil have been recognized in it, and some of the prescriptions are exceedingly simple. A contributor to the *Pharmaceutical Journal* of June 2, 1923, writes as follows: "Although assiduous students of medicine the Egyptians invariably associated their treatment with magic formulæ without which the drugs themselves were considered useless. The prescriptions given in the "Papyrus

Ebers" are accompanied by many such magical charms. In administering an emetic, for example, it was considered necessary to employ the following appeal to the evil spirit of the disease: "Oh demon who art lodged in the stomach of M., son of N., thou whose father is called Head Smiter, whose name is Death, whose name is cursed for ever, etc., etc. . . ." In spite of their superstitious rites, however, the Egyptians must have possessed a good knowledge of the action of drugs. This is shown, for example, in that knowledge that enabled them to select those antiseptics suitable for the preservation of their mummies."

We will bridge the centuries and come to Hippocrates, who, born in 460 B.C., was known as the "Father of Medicine" and by the Arabs as the "King of Health." He travelled extensively in the search for knowledge, and was brought into contact with the Hindu physicians whilst serving under Alexander the Great, during the latter's tour of conquest. He wrote extensively on medicine and pharmacy, but many of the works bearing his name are deemed spurious, and it is difficult to detect the true from the false. About thirteen known works are accepted as genuine by Littré. His influence is, however, undeniable, and he introduced into Europe from India and other parts of the world many drugs which are at present included in the British Pharmacopœia, including cardamoms, sesame, ginger, pepper, and opium. Hippocrates was remarkable for his entire disregard of superstitious practices, and stereotyped methods. The Greeks borrowed their pharmaceutical knowledge largely from the Egyptians, but Hippocrates was at least original.

From Hippocrates it is not a very far cry in the history of the world to Dioscorides (*circa* A.D. 60), who "deeply influenced the modern pharmacopœia." Although a Greek he served like many of his countrymen with the Roman armies.

He was appointed as an assistant to a surgeon serving under the Emperor Nero, probably as a compounder, and during his travels collected much data which were valuable to him in later days. Charles Singer says of him "that his *materia medica* provided most of the botanical knowledge that reached the middle ages" and that this work was the basis on which every modern pharmacopœia was founded. It was translated into nearly every language from Anglo-Saxon and Provençal to Persian and Hebrew," and for nearly sixteen centuries Dioscorides was recognized as the supreme authority on medical botany. In his *materia medica* he dealt with the attributes of nearly seven hundred trees, shrubs and plants, as well as ninety mineral substances and sixty-eighty products from the animal kingdom. The introduction to pharmacy of medicated wines is said to be due to Dioscorides. Of the other Greek pharmacists it will be sufficient to mention Galen of Pergamos (A.D. 131 to 201) to whose reputation we are indebted for the word "galenical." He has been referred to as the greatest biologist of all times. Galen, too, made extensive travels to collect and report on the medicinal values of plants. He was an ardent admirer of

Hippocrates, and frequently makes reference to him. It is interesting to note that Galen has left on record a prescription for toothache, composed of black pepper, saffron, opium, carrot seeds, parsley seeds, and aniseed, crushed and made into a paste for introduction into a hollow tooth.

The glories of Greece declined, and pharmacy was neglected by the Romans. Most of the works on this subject which they possessed were translations from the Greek. Pliny writes: "Medicine in spite of its lucrateness is the one art of these Greeks that the serious Roman has so far refused to cultivate. Few of our fellow citizens have been willing even to touch it, and if they do they desert at once to the Greeks." Cato wrote of Rome that it was "*sine medecis sed non sine medicina*" (C. Singer).

After the fall of the great empire centuries of intellectual darkness came to Europe. Art, literature, and science became dormant. A decadent church and a corrupt state combined to bring about a condition of affairs whereby medicine and its sister art of pharmacy were adulterated with magic and superstition.

Then at last there came a period of awakening, and from a least expected quarter. "No period of European history," writes Wooton, "is more astonishing than the records of the triumphant progress of the Arab power under the influence of the father of Islam . . . but the rapidity of the conquests of Mahomedanism was perhaps less remembered than the extraordinary accumulation of ancient learning, and the development of new sciences under the hitherto unlettered Arabs." Sir Prafulla Chandra Ray, the eminent Indian scientist, states "that the knowledge of pharmacy which the Arabs brought to Europe was derived from the Hindus."

That is true as we have already seen, but our debt to the Arabs is due not so much to their researches, valuable as they were, but rather to their translations from the Greek and other languages of the works of Hippocrates, Galen and Dioscorides, and it is generally accepted that our present knowledge of the Greek masters is from translations which were afterwards made from the Arab texts. It was about the middle of the eleventh century that European writers began to translate into Latin these works.

Gibbon writes of the Arabs: "The science of chemistry owes its origin and improvement to the industry of the Saracens. They first invented and named the alembic for the purposes of distillation, analysed the substances of the three kingdoms of nature, tried the destruction and affinities of alkalies and acids, and converted the poisonous minerals into soft and salutary medicines."

The Arabs not only translated the Greek masters but used them as a stepping-off place for further researches. In the words of Dr. C. H. La Wall: "It has been said that Arabian medicine is a composite blend of Greek medicine (which came through the Nestorians), of the medical practice

of the Jews (obtained by direct contact with these people), and of the astrology and occult lore of Egypt and India."

The name of the Caliph Haroun-al-Raschid is sometimes only connected with his adventures in the "Arabian Nights," but in the year A.D. 800 he actually founded the University at Baghdad, where the study of chemistry, medicine and pharmacy was undertaken with great zeal. He encouraged the collection and importation of drugs from India and other places, and by him and his successors the world was combed for the greatest authorities on the sciences, irrespective of race or creed. Some of the most prominent of the Indian physicians came to Baghdad at his invitation, and it says much for the religious toleration of the Arabs that John Mesuë, a Nestorian Christian, was persuaded to come and teach pharmacy and medicine in the Moslem schools. During the administration of Haroun-al-Raschid the first known public dispensaries were instituted in Baghdad in A.D. 807, and it is on record that so anxious was this enlightened prince to encourage the development of the healing arts, that in the same year he sent representatives to the Court of Charlemagne with gifts of balsams, ointments, and medicines with detailed instructions as to their use.

The first of the known writers of the Mahommedan school was said to be Geber (*circa* 702 to 765), although some writers doubt whether a man of this name ever existed. He has over two hundred treatises attributed to him, and he is reputed to be the originator of nitric and sulphuric acids, corrosive sublimate and lunar caustic. His name originated the word "gibberish" in our language, owing to his fantastical and exaggerated descriptive writings. Other masters of the same school were Avicenna and Rhazes. Avicenna, known in his time as Al-Hussein-Abu-Ali-Ben-Abdallah-Ebn-Sina, was born at Bokhara in A.D. 937.

His precocity was reported to be such that at the age of 18 he performed an operation on an Arab prince with such success that he was given permission to have access to the royal library, a rare privilege in those days. He led a dissipated life, but travelled widely and added to his knowledge of the ancients by practical experience. He died at Ishapan in the year A.D. 1038, and it has been said of him: "that all his knowledge of medicine left him unable to take care of his own health, and all his philosophy failed to make him moral." He is best known to fame by his "Canon of Medicine," which work was generally accepted as the standard authority for many centuries. Avicenna's favourite prescriptions contained camphor and manna. He regarded corrosive sublimate as the most potent of all poisons, and is stated to have been responsible for the gilding and silvering of pills, which process, however, he used as an addition to the medicinal value of the pills, and not as a means to produce elegance in compounding.

Rhazes, or Ar-Rasi, a Persian, born about the year 841, was a voluminous writer, having nearly 250 works to his credit. He is the author of an

encyclopædia of medicine, which is notable as containing the earliest known description of small-pox and measles. He recommended various treatments for common diseases, which would not be considered as out of the ordinary at the present day, such as milk of sugar for phthisis, cold water for fevers, cold water and butter-milk for digestive diseases, and considered that the playing of chess was an excellent cure for melancholia. He was strongly opposed to the indiscriminate practice of administering drastic purgatives, which was followed by the Greeks.

Rhazes died, stricken with blindness, in A.D. 932.

Mesué, or as he was known by the Arabs, Yahya-Ibn-Masawaih, and sometimes by his contemporaries, John the Damascene, was responsible for the translation of many of the Greek writers, including Hippocrates and Galen. He is the connecting link between the Arab teachers and modern pharmaceutical formulæ, for it is generally admitted that the first London Pharmacopœia, of which more hereafter, was based on the works of Mesuë. As evidence of the influence of the Arabs on modern pharmacy it will be sufficient to refer briefly to the number of words of Arabic origin which are in present use, and which are part of our language.

Alcohol.—Arabic, Al-Kohl was a word originally used to describe the antimony preparation which was employed as a cosmetic to darken the eyebrows. It became later to mean a stain, or a finely-ground powder used for staining, and the word finely embraced all substances rendered fine or pure by mechanical processes, more especially with regard to the process of distillation, and particularly to the spirit distilled from wine. The French chemist, Baumé, in 1773, defines "alcohol," firstly, as "powders of the finest tenacity," and secondly, as "spirit of wine rectified to the utmost degree."

Julep.—Originally Persian, from "gul," a rose, and "ap," water. Used by the Arabs to denote a clear, sweet liquid without any oil or sediment."

Syrup, originally *Sherab* or *Shurab*.—The words "Sherbert" and "Shrub" are derived from the same original.

Sugar.—Another substance introduced by the Arabs from India. It was first used medicinally. The word originally meant a gravel, c.f., candied sugar.

Alkali.—Arabic, Al-qaly, a word meaning to fry, and was first used to describe the ashes from plants produced by frying or roasting.

Alembic.—From "Ambix," a still, but the word was borrowed from the Greek "Ambix," a vase.

To the Arabs is also due the introduction into Europe of such well-known drugs as rhubarb, senna, camphor, musk, cloves, cassia and tamarinds, although many of these were in use by Indian physicians centuries before.

The followers of Mahomet in their triumphant progress of conquest invaded Spain in A.D. 711, and in the same century founded the University of Cordova, which afterwards, in direct communication with the Universi-

ties of Arabia, was the road whereby the culture of the Arab masters was introduced into Europe. Many Moorish, European and Jewish students who had received their training at Cordova, wandered about Europe practising medicine, but they led a somewhat hand-to-mouth existence, owing to the antagonism of the recognized physicians, who had a strenuous ally in a Church that issued her fiery denunciations against the heretical vagrants who dared to introduce healing methods which had no divine authority, or its then equivalent, papal approval.

Some of these wandering students found their way to England, and were so far successful as to encourage the growth of a large number of ignorant imitators, and these exercised such a baneful influence that in 1421 Henry V passed an ordinance against these meddlers with physic and surgery. The law was framed "to get rid of the mischiefs and dangers . . . by means of those who have used the arts and practice of physic and surgery pretending to be well and sufficiently taught in the same arts when of a truth they are not so."

The influence of another school of medicine left its mark on the modern pharmacopœia. The School of Salerno "was the oldest school of medicine in mediæval Europe." According to Gibbon it was the legitimate offspring of the Arabian school, but Dr. Hastings Rashdall somewhat discounts this, when he states that before the year A.D. 1080 there was no trace there of Arabian influence, but the original texts of the Greek and Latin pharmacists and physicians were not in the hands of European scholars until Aldus of Venice began to reproduce them early in the sixteenth century.

Once established, the school of Salerno became the centre where scholars of all nations, Jewish, Christian and Moslem, gathered together. "It became the reservoir for the united learning of the Greeks and Latins, and subsequently of the Arabians, and from it flowed those fructifying streams of knowledge which carried its influence to the confines of the civilized world."

This school produced a somewhat curious work under the title of "Regimen Sanitatis Salerni," also known as the "Flos Medicinæ," a pharmacopœia in rhyme said to be the work of several doctors of the university, and more particularly of John of Milan, which was published at the end of the eleventh century. It was dedicated to a king of England, "Anglorum Regni scripit schola tota," either to Edward the Confessor, William the Conqueror, or more likely to the latter's son Robert of Normandy, king of England *de jure*. This latter prince visited Salerno in 1099 and 1100 to receive treatment for a poisoned arrow wound. This book was first translated into English in 1528, and copies of the original translation are to be seen in the British Museum and in the John Rylands Library at Manchester.

Several reprints appeared in later years, and its popularity was enormous. Some extracts of the work appeared in the *Pharmaceutical Journal*, and two of the verses are reproduced here:—

"The seed of mustard is the smallest graine
 And yet the force thereof is very great
 It hath a present power to purge the braine
 It adds unto the stomach force and heat
 All poyson it expels, and it is plaine
 With sugar tis a passing sawse for meat
 She that hath hap a husband bad to bury
 As is therefore in heart not sad but merry
 Yet if in show good manners she will keepe
 Onyons and mustard seed will make her weep

By eating cherries great good doth arise.
 To such as use them for the learned wise
 Say that they purge the stomach, and beside
 The broken stones and kernals have been tried
 To breake the bladder stone, breed wholesome blood
 To fat and feed the body they are good."

This work was used for instructional purposes, as a sort of aid to memory.

No historical summary of pharmacy would be complete without reference to Paracelsus, the name adopted by Phillipus Theophrastus Bombastus von Hohenheim. He was born at Einseideln, Switzerland, on November 10, 1493, and it is said that he received his first grounding in pharmacy and medicine from his mother, a hospital matron.

He took upon himself the name of Paracelsus "probably," as Le Wall says, "having as his ambition the goal of becoming more learned than Celsus, the famous Roman physician." He was a most revolutionary character and equally despised surgeons, physicians and apothecaries. Like his Greek forerunners Hippocrates and Dioscorides, he travelled widely in the search for knowledge and during his wanderings visited all the notable universities of Europe, but ridiculed the teachings of them all. He particularly despised the works of Galen, and Browning, who took Paracelsus as the subject for one of his earlier poems, puts the following words into his mouth :—

"That yellow, blear-eyed wretch in chief
 To whom the rest cringe low with feigned respect,
 Galen of Pergamos."

Paracelsus is perhaps best known to pharmacy as the enthusiastic advocate of the medicinal value of the metals, especially mercury.

He invented the word "laudanum" and was a great believer in the efficacy of opium.

The following extract from a translation of Paracelsus by John Hester (1623), "Secrets of Physick and Philosophy," will give the reader some idea of his writings and opinions: "For I am sure there is nothing better in all physick that ministereth eyther better, or readyer helpe to cure man's body, than this science of preparing metals with fire rightly. I say rightly prepared, not as the unskilful apothecaries have ordered them, or as the unlearned physitians have occupied them, for the apoticary is no other than a servant in the kitchen (as I may terme him) and no master cooke,

so long as he knoweth not these preparations which I will shew you. In laike manner it is to be thought of the physitians that have no skill in these preparations. For we have seen and proved divers times that the first vapour or smoke of any herbe or spice is the best that there is therein, and yet our learned physitians commaund it to be boyled untol half is consumed."

In "Hudibras" Butler describes the mysterious remedy which Paracelsus is said to have carried in the pommel of his sword, probably laudanum :—

"Bombastus kept a Devil's bird
Shut in the pommel of his sword
That taught him all the cunning pranks
Of past and future mountebanks."

Garrison, in his "Introduction to the History of Medicine," sums up the life work of Paracelsus in the following words :—

"Far in advance of his time, he discarded Galenism, and taught physicians to accept chemical therapeutics; he attacked witchcraft and the strolling mountebanks, he opposed the silly uromancy and uroscopy, he was the first to write on miners' (occupation) diseases and the first to establish a correlation between cretinism and endemic goitre; almost the only asepsist between Mondeville and Lister, he taught that nature (the natural balsam) heals wounds, and not officious meddling; he introduced mineral baths, and was one of the first to analyse them; he made opium, mercury, lead, sulphur, iron, arsenic, copper sulphate (called the *specificum purgans Paracelsi*) a part of the Pharmacopœia, and regarded zinc as an elementary substance; he distinguished alum from ferrous sulphate and demonstrated the iron content of water by means of gallic acid."

Another pharmacist who achieved fame in his day was the Frenchman Antoine Baumé (1728-1804), who, if remembered for nothing else, achieved fame by the introduction of the hydrometer. He was a painstaking and intelligent student, and did much to rid pharmacy of many of its superstitious appendages, and ridiculed the absurd and disgusting prescriptions containing animal matter which were prevalent at the time, and which were, as we shall see later, included in the early official pharmacopœias of Britain. Baumé's work, "Eléments de Pharmacie Théorétique et Pratique," first published in 1762, was famous in its day, passed through many editions, and was translated into English.

Lists of drugs and herbal remedies continued to be published in England without official sanction, but many of them were merely extracts from the old masters, and translations. Dr. (Sir) William Boleyn, or Bullen, of the same family as Henry VIII's unfortunate queen, however, wrote a book of simples which is noteworthy as being original (*circa* 1570) containing a list of British medicinal plants, and their curative properties.

The book is interesting also for the rules and regulations laid down for the guidance of a dispenser. They include the following :—

"To have his mortars, stills, pots, filters, glasses, boxes, clean and sweet.

"To have charcolas at hand to make decoctions, syrups, etc. That he neither increase nor diminish the physican's bill (Prescription) and keep it for his own discharge.

"That he peruse often his wares that they corrupt not.

"That he put not in *quid pro quo* (substitutes) without advisement.

"That he do remember his office is only to be the physician's cook.

"That he do use true measure and weight."

The College of Physicians was incorporated in London in the year 1518, largely owing to the efforts of Dr. Thomas Linacre, that learned physician whom the great Erasmus condescended to call friend. Linacre was an earnest Greek student and did much to introduce the revival of learning in this country. He translated the works of Galen from the Greek. The College first applied itself to the consideration of an official pharmacopœia in the year 1585,¹ but the matter was shelved as being too vast an undertaking until the year 1589, when ten committees were appointed to compile the various sections of the work. It was not, however, until exactly a century after the incorporation of the Royal College that the work was published in May, 1618, and was called the "*Pharmacopœia Londoniensis*," and its curious title-page bore the figures of Hippocrates, Galen, Mesuë and Avicenna. At the same time a royal warrant authorized the College to examine "the shops of apothecaries within eleven miles of London, and destroying the compounds which they found unfaithfully prepared."

The first edition of the London Pharmacopœia, "the first pharmacopœia to be officially adopted by a nation," was based chiefly on the works of Mesuë and Nicholas of Salerno. It was found to be so full of typographical errors, owing to the haste with which the printer set about his task, and lack of proper expert supervision, that the whole edition was cancelled, and in December of the same year the College published a corrected reprint. The wretched printer was severely castigated in the preface for his errors. Both these editions contained a dedication to King James I, by Sir Thomas Mayerne, a physician of Swiss extraction. He is said to have introduced the use of calomel and "black wash" into medicinal practice in Britain. Mayerne was physician in ordinary to the queen of James I, and afterwards to Charles I and Charles II.

It is astonishing to note in the first pharmacopœia the number of remedies obtained from the animal kingdom, revolting in their details. Parts of the human frame and human excreta were presented officially as cures for various ailments, but these were considered quite effective by the Greeks and ancient Egyptians, although the Arabs seem to have thought them unsatisfactory, possibly as contrary to the teachings of their prophet.

Nicholas Culpepper, in his "*London Dispensatory*," states: "The

¹ The first actual pharmacopœia which received government authority was published at Nuremburg in 1549, and was a compilation of numerous prescriptions collated by one, Valerius Cordus.

skull of a man that was never buried being beaten to powder and given inwardly the quantity of a dram at a time in Betany Water helps palsies and falling sickness." Culpepper, a charlatan in some things, but a keen student, severely criticized the first and second editions of the London Pharmacopœia, and stated in so many words that some of the prescriptions showed a lamentable lack of pharmaceutical knowledge.

This first edition was a stupendous volume. It contained, in the words of Le Wall: "1,028 simple drugs and 982 preparations and compounds. There were 91 animal drugs, 271 herbs, 138 roots, and 138 seeds. In the list of preparations there were 213 distilled waters, 115 conserves, 58 electuaries, 45 lozenges, 53 ointments, 51 plasters, and 17 chemicals. The most complicated preparation was the *antidotus magnus Matthioli*, which called for 130 ingredients, some of which were complex in themselves."

The second edition appeared in 1655. It altered the measurement of a gallon of water from 9 lb. to 8 lb., and introduced amongst other things corrosive sublimate, red and white precipitate, cochineal, antimony wine, and the wonderful favourite remedy of the skull of a man killed by violence, finely powdered, and the moss from that skull.

The third edition, published in 1678, introduced whisky as an official remedy, under the nomenclature of *Aqua Vitæ Hibernorum sive Usquebaugh*. (The word "whisky" is a corruption of Usquebaugh.) It also made official burnt alum, benzoin, Jesuit's bark (cinchona bark), jalap, and iron wine.

The fourth edition of 1721 is interesting, as it marks the transition from the old to the new pharmacy. The nomenclature of plants was given both in Latin and in the commonly-used names, and some of the absurd superstitious formulæ were rejected. Amongst new remedies were pot. sulphurata, tinct. ferri perchlor., ferri sulph., lunar caustic, tartar emetic, sal volatile, elixir of vitriol, and lime water. Certainly the influence of old Paracelsus was here. Cold cream, or *unguentum refrigerans*, as it was generally called, the composition and introduction of which was attributed to Galen, was omitted, but was introduced at a later date and still remains. This edition was compiled under the direction of Sir Hans Sloane, Physician to Queen Anne, President of the Royal College of Physicians and of the Royal Society. Sloan is well known at the present day mostly with reference to the Museum which he left to the nation, and which still bears his name. His books, which he also bequeathed to the nation, numbering 3,556 manuscripts and 50,000 volumes, formed the nucleus of the British Museum. Sloan was also the donor to the Apothecaries' Company of the freehold of the Botanical Gardens at Chelsea, which he left on condition that the company presented to the Royal Society fifty new plants annually until the number amounted to 2,000. Sloan's only contribution to pharmacy was a paper on the St. Ignatius bean.

The fifth edition, published in 1746, drastically removed many of the

complicated and inelegant prescriptions, although a number of the "animal" products were still retained. Dr. Plumtree, author of "*Dissectio Medico-Physica de Carolinus Therme*," was President of the Royal College of Physicians at this time, and was editor of this edition. Associated with him were Drs. Crowe, Mead, Heberden and Freind.

Mead was the author of several medical works, including "*A Mechanical Account of Poisons*." He was one of the earliest experimenters in physiology, and many of his researches were the basis of modern investigations. Prior to the advent of Jenner and vaccination, he had taken up inoculation treatment against small-pox, which had been introduced by Lady Mary Wortley Montagu from Adrianople. Mead's private life was much in the limelight in his day, and he suffered a good deal from the scurrilous pamphleteers who existed in those outspoken days. One of his amours was the subject of a printed attack, and the author only thinly disguised the name of the object of his spleen. This literary effort introduced itself as follows:—

"The Cornutor of Seventy Five; being a genuine narrative of the Life, Adventures, and Amours of Don Ricardo Honeywater, Fellow of the Royal College of Physicians of Madrid, Salamanca and Toledo, and President of the Academy of Sciences in Lapland, containing amongst other most diverting particulars his intrigue with Donna Maria W . . . of Via Vincullosa, anglisé Fetter Lane." Mead died in 1754 and has a bust with inscription erected to his memory in Westminster Abbey.

Freind was for some time (1705-07) physician to the Earl of Peterborough's army in Spain, and published an account of the expedition. He was a Greek scholar of no mean order, and made several translations into English. He sat as Tory member of Parliament for Lancaster in 1725, and was associated with Bishop Atterbury in the plot to dethrone the House of Hanover for the House of Stuart. For this he was imprisoned in the Tower, and during his captivity wrote several works, including "*The History of Physic from the time of Galen to the Commencement of the Sixteenth Century*." He came into popular favour again, for when he died in 1728, like his friend Mead, he had a bust erected to his memory in Westminster Abbey.

His death was the subject of numerous poems, amongst which the following epigram appeared in the *Annual Register*:—

"When Mead reached the Styx, Pluto started and said,
'Confound him! he's come to recover the dead.'"

Of Drs. Heberden and Crowe nothing much is known except that they had the reputations of being studious and conscientious.

In 1788 the sixth edition was issued. It was marked by further simplifications, and threw out some of the complicated prescriptions which had but one recommendation, that they had been in use by physicians for 2,000 years. Amongst drugs and preparations officially recognized for the

first time were aconite, calumba, quassia, castor oil and senega, Dover's powder, James' powder, Huxham's tincture (tinct. cinchona co.), Hoffman's anodyne, and Friar's balsam.

The seventh edition introduced the French system of chemical nomenclature, and the minim was substituted for the drop. The chief innovations were arsenic, belladonna, digitalis, decoct. aloes co., confection of roses, Griffith's mixture, Plummer's pill, and zinc ointment. This edition appeared with corrections in 1815.

In 1824 the eighth edition appeared, and introduced confection of pepper and vinum colchici, but refused to have anything to do with the recently discovered drugs, morphine, iodine, and quinine, which were in general use by practitioners of the time.

The edition of 1824 marked a distinct advance. It was mainly the work of Richard Phillips, sometime Professor of Chemistry at the Royal Military College, Sandhurst. B. B. Woodward, in the "Dictionary of National Biography," says of him: "His acute powers and the perfect familiarity he possessed with the processes in use enabled him to detect the errors in which the compilers of the 'London Pharmacopœia' had fallen, and though the keenness of his criticism created much soreness their justice was admitted, and he was specially consulted in compiling later editions." This edition for the first time contained the official tests for the purity of drugs, and introduced aconitine, morphine, quinine, strychnine, iodine, bromine, prussic acid, creosote, ergot, biniodide of mercury, and compound rhubarb pill.

The tenth and last edition of the "London Pharmacopœia" was published in 1851. It rejected biniodide of mercury, and admitted cod-liver oil, chloroform, atropine, extract nux vomica and zinc chloride.

During the publication of the "London Pharmacopœia" the principal London Hospitals (St. Thomas', Guy's, and St. Bartholomew's) in 1741, issued their own dispensatory, of which Le Wall says: "A casual survey of this will reveal much that is illuminating regarding the materia medica of that day, for it is to be presumed that these hospitals drew their medical attendants from the best of London's medical practitioners. Viper's flesh was used in one of the preparations and wood lice in several. Dried horse's hoofs were recommended for spitting of blood. Opium was known under the title *extractum thebaicum*, and was used in the majority of the formulas. Calomel was given in ten-grain doses and jalap in thirty-grain doses. The introduction to this work would seem to us to-day to be anything but suitable for such a book. On one page is an illustration with the verse :—

" In the midst of life, death doth us pursue,
Let each, therefore, with speed for mercy sue."

The motto of the book was: "Prepare to die, for behold Death and Judgment is at hand."

Quite a pleasant book to fall into the hand of a prospective patient.

The Universities of Edinburgh and Dublin also issued official pharmacopœias. The first "Edinburgh Pharmacopœia" was published in 1699, and the final one in 1841. The first Dublin pharmacopœia was published in 1687, and the last one appeared in 1850.

Unfortunately these pharmacopœias laid down varying strengths for the same preparations, and led to considerable dissatisfaction, with the result that in 1858 the Medical Act was passed which enacted that : "The General Council shall cause to be published under their direction a book containing a list of medicines and compounds, and the manner of preparing them, together with the true weights and measures by which they are to be prepared and mixed, and containing such other matter and things relating thereto as the General Council shall think fit, to be called 'The British Pharmacopœia,' and the General Council shall cause to be altered, amended and republished such pharmacopœias as often as they shall deem it necessary."

As the result of this act the first British Pharmacopœia was published in 1864, and appeared in English. Prior to its issue the Medical Council Act of 1862 laid down "that the 'British Pharmacopœia,' when published, shall for all purposes be deemed to be substituted throughout Great Britain and Ireland for the several above mentioned pharmacopœias (Edinburgh and Dublin). This first edition caused much dissatisfaction, and many urged that the compilers were mainly doctors of medicine, and had little knowledge of practical pharmacy. This resulted in a reprint with amendments appearing in 1867, with an addendum in 1874. The preface of the 1867 edition pays a somewhat grudging tribute to the real authors of the work in its final paragraph : "The Council think it right to add that the present edition of the pharmacopœia has been prepared by Professor Redwood, of the Pharmaceutical Society, and Mr. Warrington, of Apothecaries' Hall, under the direction of a committee of the Council. . . ."

Included in this volume were the following :—

Plain water as distinguished from distilled water. Natural water, the purest that can be obtained cleared, if necessary by filtration.

Tests: Free from odour, taste and visible impurity.

The character of *digitalis folia* will sound strange to modern students : "Ovate, lanceolate, shortly petiolate, rugose, downy, paler on the under surface, crenate, collected when about two-thirds of the flowers are expanded."

Soda water was official under the designation of *liquor sodæ effervescens*. Characters and tests : "Effervesces strongly when the containing vessel is opened."

Crumb of bread is described as *mica panis*.

Ovi vitellus was described as the yolk of the egg of *Gallus banckiva* var. *domesticus*. There are no directions as to its age.

In the third edition of 1885 "an endeavour was made for the first time to fix the alkaloidal strength of some of the tinctures."

The fourth edition of 1898 went further and standardized various salts as to their "total alkaloids." The latest and fifth edition of 1914 employed the metric system in addition to imperial measures for the official doses, and in the preface deprecates the use of the drachm and ounce symbols, as being inaccurate and misleading.

It would seem to be only a question of time when the world will see an International Pharmacopœia. In 1906 an International Conference adopted "the International Agreement" to standardize the formulæ for potent drugs and preparations in the several national pharmacopœias, and new editions in the various countries who were represented at the conference adopted the recommendations, including the pharmacopœia of our own country.

Whilst this article was in process of completion there appeared in 1927 the latest contribution to pharmaceutical history, Dr. Charles H. Le Wall's, "Four Thousand Year's of Pharmacy." It could not be ignored and has been frequently quoted in this article, in fact it caused an entire revision of the article. It is commended to all serious students of the history of pharmacy, if only for the excellent bibliography which it contains.

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A TROUBLESOME WATER SUPPLY.

BY MAJOR R. H. ALEXANDER, M.C.
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SHORTLY after emerging from the Senior Course at Millbank, I was posted to a small and out-of-the-way station somewhere in the U.K. Being the only Regular R.A.M.C. officer there, I took over the duties and designation of S.M.O., and immediately commenced inquiring about the station from its medical and hygienic points of view. I learned that the Garrison owned, amongst other things, its own "water works" and its own "sewage plant." With relief I remembered that I had not yet discarded the hygiene notes which I had known by heart only a few months before, and I had determined to peruse those at leisure when making full investigations into the intricacies or otherwise of the water supply and sewage disposal arrangements. I very soon discovered that my study of the former of these systems was not to be of the leisurely nature, as lots of trouble awaited me the very next morning.

My bath-water was dark brown!

This was annoying; but thinking that a rusty pipe or cistern in my quarter was the probable cause I sat down to breakfast in peace. Unfortunately, the O.C. troop's bath-water was also brown, as also was that of every individual in the garrison; so immediate action by the engineer and medical services was necessary to investigate the cause, and to ascertain that no harmful ingredients had entered the supply.

The cause of the discoloration proved to be sufficiently interesting to induce me to submit this communication.

GENERAL DESCRIPTION OF THE SOURCE OF WATER SUPPLY.

Within the area owned by the War Department there exist three wells situated close together inside the electric power and pumping station building. Of these, one, a deep-bore well, was put out of action in 1915, and will not be further discussed here. One is a shallow well, not normally used for general purposes. The remaining one (hereafter referred to as Well "A"), being responsible for my pigmented bath, deserves to be described in detail.

Special Description of Well "A."—This is a bore hole. It was bored in 1915 to a depth of 1,048 feet, and steined for the upper 700 feet with steel tubing (spelling is correct), of diameters as shown in the plan. In the water-bearing strata the steining is perforated by $\frac{3}{4}$ -in. holes.

Centrally situated within the bore is the rising main, constructed of screwed-on wrought-iron piping.

The method of raising the water is by air-lift, i.e., compressed air is liberated near the bottom of the rising main. On the principle that a column of air and water mixed is lighter than one of plain water, the air and water are discharged above ground level. In this particular case the compressed air is led to the above-mentioned point of liberation by a 2-in.

wrought-iron pipe, placed between the steining and the rising main and inverted into the latter for two feet.

When the work of construction was completed, it was found that the rest level of the water had risen to 242 feet; that a yield of 10,800 gallons per hour was procurable; that the water was, as would be expected, bacteriologically pure and that its chemical analysis indicated perfectly delightful ablution properties.

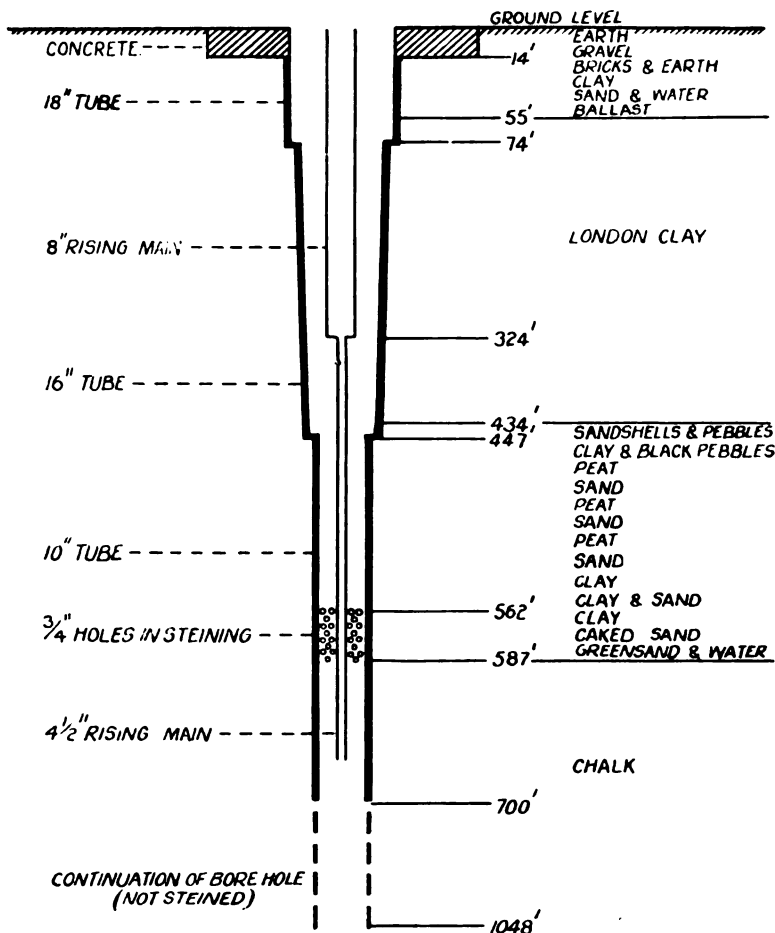


Diagram of Well "A." Not drawn to scale. Air-lift piping not shown.

This satisfactory state of affairs persisted until I arrived at the station, with the exception that the rest level had by then fallen to 337 feet.

Treatment, Storage and Distribution of Well "A" Water.—On being lifted to the surface the water is led to the first settling tank, and thereafter through a second, to a third. The capacity of these tanks is respectively 10,000, 50,000 and 10,000 gallons, and they serve a useful purpose as a considerable quantity of a very fine white sand becomes sedimented in them.

From the third tank water is pumped to two storage tanks having a total capacity of 160,000 gallons, from whence it is distributed by normal method.

Brief Description of Shallow Well.—Depth fifty-seven feet. Yield on test of approximately 2,000 gallons per hour. Total hardness 48·5. Lactose fractors present in one cubic centimetre. Used solely when mixed with well “A” water for steam raising purposes.

Explanation of Discoloration.—But little investigation was necessary to discover the cause of the trouble. The water raised from well “A” was not only brown but contained much more sand than usual and also considerable quantities of peat. Some particles of peat were extremely hard and brittle and measured up to two inches in diameter. They could not have passed through three-quarter-inch perforations, so the diagnosis was too easy. The probable sequence of events was that a subsidence in the strata had occurred causing the bore casing to give way round about the 450 to 500-foot level. The fact that the yield had fallen to 8,000 gallons per hour further substantiated this theory.

Provisions made for Future Supply.—The immediate action necessary was to arrange for clarification of the water and for alternative supply should well “A” become blocked.

The former problem was efficiently tackled by adding alum to the first settling tank and fixing a cloth filter between the second and third. In this connection it should be stated that as the water to be treated was naturally alkaline, commercial alum (analysed at the College and found free from arsenic in any dangerous amount and from other poisonous material) was used in preference to Service clarifying powder. The results were excellent and considerable economy effected, viz., 14s. 6d. per hundred-weight, as against £2 1s. 10½d. per case of thirty pounds. The question of alternative supply, however, was not so simple, as the daily requirement of the garrison is about 35,000 gallons.

(1) For financial reasons the construction of a new well was tabooed.

(2) Civilian resources might be tapped but the cost of the only suitable supply was high.

(3) The old well not here described might be tinkered with.

(4) The shallow well might prove a sufficiently good stop-gap till a breakdown of well “A,” if it occurred, was rectified.

This last suggestion was most favoured, as at any rate the 230,000 gallons reserve of water in the settling and storage tanks would allow a full week's work on repairs being effected without great inconvenience. Indication for the chlorination of the shallow well water was very evident, but the third settling tank was admirably suited for this purpose.

Later Developments.—During the subsequent fourteen months well “A” functioned with fair success; but occasional stratal disturbances occurred, manifested by excessive muddiness of the water and a gradually diminishing yield.

Eventually a complete collapse of the bore hole wall gave us the opportunity to test our alternative scheme. The shallow well, however, did not live up to its reputation; the expected yield of 2,000 gallons per hour was not forthcoming. The test which had suggested this yield to be probable had been entirely false, as the water had been allowed to run to waste and to find its way back to the well again. Fortunately the R.E.'s lost no time in extemporizing with well "A," and in a few days water was again available from that source (4,500 gallons per hour of good quality). They had cleared the bore hole down to 680 feet and inserted a new 1½-inch air lift pipe within the rising main which was now appreciably shortened.

Future Prospects.—These are not bright. The D.A.D.H. of the area helpfully reports that "the whole question seems to be a difficult engineering problem." It is also a difficult financial one. Well "A" is still producing its 4,500 gallons per hour, but the cost of raising this is abnormally high. Air-lift pumps have many excellent qualities and are of particular value when dealing with sandy or gritty water, but their low efficiency causes considerable expense when a high yield is not available.

"The Royal Engineers are responsible for the provision and efficient and economical maintenance of all pumping machinery, reservoirs, tanks, wells, and other W.D. Works for the supply of water." "The Officer in Medical Charge of Effective Troops will satisfy himself that the amount, quality, and arrangements for distribution of drinking water are satisfactory." These regulations cut and dry the duties of the respective Services, but nowhere is it suggested that either Service should be unconcerned in the characteristics and functions of the other, and perhaps these notes may be of some interest to officers who do not normally study "Military Engineering (vol. vi.) Water Supply, 1922."

WATER ANALYSIS.

General Remarks.—Well "A" Water: Colourless, odourless and alkaline. A sediment and some suspended matter resembling clay.

Shallow Well Water: Turbid, yellow tinted, odourless, with slight brownish-white sediment. Alkaline reaction.

Chemical Analysis.—Parts per 100,000.

	Well "A" Water	Shallow Well Water
Ammonia, free and saline	0·0256 ..	0·0298
" " albuminoid	0·0012 ..	0·0104
Oxygen absorbed from permanganate at 27° C.:		
15 minutes	0·10 ..	0·069
4 hours	0·19 ..	0·104
Nitrogen present as nitrites	Present ..	Nil
" " " nitrates	Nil ..	0·02
Chlorine present as chlorides	32·3 ..	13·0
Hardness—Temporary	3·4 ..	37·6
Permanent	Nil ..	10·9
Total solids	121·6 ..	90·4
Poisonous metals	None detected ; iron was present ..	None detected ; iron was present

Bacteriological Examination.—

Lactose fractors (presumptive *B. coli*) Nil in 100 c.c. .. Present in 1 c.c.

Editorial.

WE have just received the report on the health of the Army for the year 1926, which was submitted to the Secretary of State for War in November, 1927. The arrangement adopted in previous reports has been continued, and in the present report attention is drawn to the more common ailments which account for a large proportion of the non-effectiveness in the Army throughout the year.

During the year under review the health of the troops has been satisfactory, although there was a slight increase in the admission rate as compared with 1925. The invaliding and constantly sick rates show further reductions.

The number of officers admitted to hospital was 298·4 per thousand of the strength, and the principal causes of admission were malaria, inflammation of tonsils, and inflammation of the areolar tissue. At the Royal Military Academy, 137 gentlemen cadets out of an average strength of 199 were admitted to hospital. Three cases of acute anterior poliomyelitis occurred during the year; two returned to duty and the other was still on sick leave at the end of the year. Most of the sickness was due to local injuries occurring during training and organised games. At the Royal Military College, out of an average strength of 341, 313 were admitted to hospital; here again the greater number of admissions were caused by accidents; 63 were due to influenza.

The incidence of sickness among soldiers during the year shows a slight increase, the admission rate being 454·8 per thousand of the strength as compared with 446·2 in 1925. The principal causes of admission to hospital during 1926 were malaria, for which there were 10,159 admissions; venereal diseases, which caused 7,795 admissions; inflammation of tonsils, and inflammation of the areolar tissue. Influenza and inflammation of bronchi also gave rise to a considerable number of admissions. Influenza, inflammation of tonsils, and malaria caused an increase in the admission ratio as compared with 1925; on the other hand, sand-fly fever, gonorrhœa, diseases of the ear and nose caused fewer admissions.

Judged by the sick time to each soldier, commands with the highest ratio of inefficiency were Malaya, West Africa, and North China. Bermuda and Malta had the lowest ratios. The number of invalids discharged from the Army during the year was 10·68 per thousand of the strength, compared with 11·12 in 1925. The principal causes of invaliding were inflammation of the middle ear, tuberculosis, and valvular disease of the heart. The principal causes of inefficiency and admission to hospital were gonorrhœa and malaria. The average sick time of each soldier was 9·35 days as compared with 9·38 in 1925. The number of soldiers treated as out-patients was 199,087 or 1048·3 per thousand of the strength. The combined ratio of constantly sick in hospital, and under treatment as out-patients, was 39·65

per thousand of the strength as compared with 39·01 in 1925, 39·26 in 1924, and 32·21 in 1913.

The most interesting part of the report is that devoted to the consideration of "common diseases." We are told that from a military point of view the actual cause of inefficiency is of little importance, an officer or soldier is either fit or unfit to undertake his duties; but to the medical officer the actual cause looms large. It may be only a simple ailment or a difficult scientific problem.

The medical officer is naturally much more interested in the scientific problem, and is apt to regard the simple ailment as a matter of course. From the point of view of efficiency in the Army, the simple ailments are of great importance, and this will be readily understood when we realize that the number of men constantly sick in hospital for common diseases was 1,217·79 in 1925, and 1,154·65 in 1926, and that the number of working days lost to the Army at home on account of these diseases was 444,494 in 1925, and 421,557 in 1926.

Now the Army consists of a selected population, well housed, well fed, well clothed, well exercised, and well supervised, and the reasons for this loss of service seem difficult to explain. In commands at home local injuries and diseases of the digestive system other than tonsillitis, diseases of the liver and inflammation of tonsils are responsible for the large number of admissions throughout the year. The admission rates do not seem to be affected by seasonal conditions, but remain more or less constant throughout the year. As a result of these diseases some 600 men are constantly in hospital; in other words, one battalion is constantly rendered inefficient in commands at home. Influenza causes a considerable number of admissions, but is chiefly confined to two or three months in the year, and has, therefore, a low constantly sick rate. The admissions for venereal diseases are not so high, but the constantly sick rate is only second to that of local injuries. Two very interesting charts are produced for the first time; on these we see in graphic form the monthly incidence of admissions to hospital for the most prevalent diseases at home and abroad respectively during the years 1925 and 1926.

At home, out of the 421,557 working days lost, 100,901 are caused by local injuries, 115,563 by venereal diseases, and 76,329 by diseases of the digestive system. Abroad, out of the 197,928 working days lost, 106,952 are due to venereal diseases, 35,348 to local injuries, and 33,157 to diseases of the digestive system.

The economic aspect of these common ailments is apt to be overlooked; we are told that the common cold in England at a conservative estimate costs more than £1,000,000 each winter in lost time, lost capacity for work, and the purchase of remedies of various sorts. Dyspepsia is probably much more expensive, because it tends to last much longer. It is clear that if a small reduction in the incidence of these ailments could be made there would be a very considerable saving to the nation. The importance of good feeding, good clothing, and good housing, has been insisted on in

recent years, but the experience of the Army would seem to show that these have comparatively small advantages in regard to the small ailments. Factors other than privation and distress are obviously at work, and there is a very good case made out for medical research. In the past officers of the Corps have achieved great things for the nation in the field of tropical medicine, and if they could devise a means of preventing these common ailments, the debt of the nation would be largely increased.

As in recent years, notes on diseases are continued, and the main facts are brought together so that officers can readily appreciate the many lessons to be learnt in regard to the most important diseases.

There were 154 cases of diphtheria among the troops during 1926; of these forty-two occurred in the Guards' Depot at Caterham, the majority being among recruits who had been at the depot for two or three months. A diligent search for carriers was made among the contacts and permanent staff and canteen employees, but none was found. A few cases were reported at Wellington Barracks, London; in this instance the source of infection was traced to a carrier who had been discharged from an infectious hospital some time previously.

In the Duke of York's School there was a small outbreak of six cases, and in consequence the Schick test was performed on eighty-five boys of the junior school; a positive result was noted in thirty-eight cases. The distribution of these susceptible boys, according to the length of time they had been in the school, illustrates the tendency to a loss of immunity through residence in an almost enclosed community out of contact with diphtheria cases.

There were 1,048 cases of dysentery among the rank and file as compared with 866 in 1925; 892 cases were reported from India, and the classification of these showed even more markedly than in 1925 that bacillary dysentery is probably much more prevalent than amœbic. There is still a large group of unclassified cases of dysentery but undoubtedly the figures represent a great improvement in the diagnosis of the disease. The increased incidence in 1926 over 1925 is balanced by the material reduction in the number of cases diagnosed colitis. In 1925 there were 207 such cases, but in 1926 only 45. In Cairo there were 57 cases of dysentery, and of these only two proved to be amœbic.

The incidence of enteric fever among soldiers shows a slight reduction. Iraq has the highest incidence, India comes next. An indication of the degree of protection afforded by inoculation is given by the figures from India, where the degree of exposure may be considered to be fairly uniform. In 54,439 inoculated men, there were 123 cases with seven deaths, while in 1,486 uninoculated men there were 26 cases and two deaths; in other words, in the inoculated the proportion of deaths was 1 in 7,777, and in the uninoculated 1 in 743.

The incidence of influenza, both at home and abroad, was still heavy. There were 4,360 cases in 1926 as compared with 3,047 in 1927. The type of disease varied; in some commands it was exceedingly mild. In

Aldershot two distinct types were differentiated; one with sharp fever, malaise, prostration, but rapid recovery, the other a more insidious type, with less fever but more prolonged, and attended by herpes labialis, debility and prolonged convalescence. There was a very high ratio of admissions in Ceylon, but some doubt seems to exist as to the true nature of the illness; the diagnosis appears to rest between influenza and dengue.

The returns for malaria in 1926 show that the improvement noted during 1925 has not been maintained. Including India, the total admissions were 10,159. There is very little change in the returns from individual stations; Iraq, however, shows a marked reduction.

The ratio of admissions for venereal diseases for the whole Army at home and abroad in 1926 was 41.1 per thousand as compared with 44.4 per thousand in 1925. Gonorrhœa caused the greatest number of admissions, 31.2 per thousand out of the total. On the Rhine there was an increased number of admissions, which was attributed to the move of the Army from Cologne to Wiesbaden which involved some relaxation of supervision. In Jamaica there was a very high incidence, which was probably due to the effects of the climate on very young soldiers during their first term of service abroad in a country where prophylaxis is extremely difficult. Research work on the treatment of venereal diseases has been continued; exotoxic vaccine mentioned in last year's report is being prepared by a slightly different method. The results of treatment with this vaccine are encouraging.

There were three cases of poliomyelitis among the gentlemen cadets in the Royal Military Academy during the later part of the year. As we reported on these cases in an Editorial last year, there is no need to discuss the matter further.

Middle-ear diseases continue to head the list of cases of invaliding. The majority of the cases were recrudescences of trouble originating in civil life, in spite of increased vigilance in recruiting to prevent such cases enlisting.

An increase in the incidence of tonsillitis is reported, and attempts to elucidate the cause have so far failed. In the East it is attributed to the prevalence of dust storms and is not considered to be a barrack-room infection; at home, on the other hand, barrack-room infection is thought to be a main causal factor. Bacteriological investigations have so far been fruitless, though in London the large proportion appeared to be influenzal in origin.

Special attention is given to the diseases of the digestive system, and there is a full report on duodenal ulcer and gastric ulcer. The large number of cases in which perforation is recorded suggests that these ulcers are looked upon as medical diseases until an emergency occurs, when they are admitted to hospital. Records indicate that perforation was the first symptom in seven cases of gastric and in five of duodenal ulcer.

Foot disabilities have dropped from fourth on the list in 1925 to eighth in 1926; an improvement which is due partly to greater care in the selection of recruits and partly to the use of the new boot for recruits.

The second part of the report is devoted to the special departments of medicine, surgery, hygiene, pathology, dental treatment and the medical examination of recruits.

In the department of medicine we are informed that very useful work has been done on the investigation and treatment of disordered action of the heart. Evidence is accumulating to show that an ætiological factor can be determined in a considerable number of cases, and it is thought that forethought in the after-care of men who have suffered from acute infections, such as influenza, diphtheria, malaria, etc., would do much to prevent this cardiac sequel.

It is regretted that the term "disordered action of the heart" must still be retained, as this must be considered as a symptom, and to be adopted as a diagnosis only as a last resource. Unfortunately, in a large proportion of the cases no causal factor can be discovered, and these cases present the symptom complex of an excitable vaso-motor system, and are generally young soldiers of poor physique and neurotic temperament. The retention of such men in the Army is obviously undesirable.

Under neurasthenia and epilepsy it is noted that experience seems to show there is some factor, or combination of factors, related to service in the tropics which induces the onset of epileptic or epileptiform fits in young susceptible adults.

Yatren is being used for the treatment of amoebic dysentery, and the results are being followed with considerable interest. Several cases of relapsing dysentery which proved resistant to courses of emetine have been cured by yatren administered as an injection *per rectum*.

In the treatment of kala-azar, "von Heyden 471" continues to give excellent results, and for uncured cases arriving from India it is found to be the most dependable drug.

In the domain of surgery the general improvement of work noted in 1925 continues. The operating theatres in all the principal hospitals are being brought up to modern civil standards.

In the department of hygiene some interesting work has been carried out.

In the Eastern Command the provision of screens between adjacent beds has been adopted in order to see whether the spread of disease by droplet infection can be prevented by this means. The results are so far inconclusive, but it is intended to carry out a comprehensive trial at a later date.

Special attention has been given to the training of recruits at the various depots. The course of training which the recruit undergoes is strenuous, yet it is found that the average recruit increases in weight by 6 lb. in the six months he spends there before joining his unit. In the Eastern Command trial was made of a new system of training; subsequently a modified course based on this method was adopted in several depots and has met with general approval. The system tends to produce more alertness, both mental and physical, and better health than the system in

general use, and is popular with the recruits. Squads trained on this system compare favourably with those trained by the older system.

Original investigations have been carried out, of which the following seem the most important :—

(a) Factors which might affect the health of the men serving in the Royal Tank Corps.

(b) Possibilities of reducing the weight of the water sterilizing lorry with the idea of evolving a suitable apparatus for carriage on the trailer.

(c) Improvements in the method of carriage of the soldier's pack.

(d) To find a suitable container for the new emergency ration.

(e) To find a satisfactory material for use in the manufacture of water bottles.

In the Army School of Hygiene research work on the chloramine process for the sterilization of water has been continued, and a new pattern sparklet bottle has been produced which it is hoped will prove satisfactory.

The Department of Pathology reports a steady advance in knowledge of pathology and physiology, there being an increasing appreciation of the help which efficient laboratory service can give in the treatment and prophylaxis of disease.

Great interest has been taken in the prophylaxis of colds and influenza among troops at home. Although the primary causative organisms of these diseases have not yet been ascertained, there is a certain amount of evidence that the use of vaccines directed against the more common secondary invaders may be of great value in reducing the severity of the illness to almost negligible proportions.

In January and February an investigation was made into the occurrence of the more important pathogenic organisms found in the throat in cases of pharyngitis associated with influenza at Woolwich. In all, ninety-eight cases were examined. During the month of January the cases were mild; pulmonary complications were not seen. Cultures made at this period yielded a high proportion of Pfeiffer's bacillus. During February pulmonary complications occurred, and cultures from the throat showed a marked decrease in the proportion of Pfeiffer's bacillus with a corresponding increase in the streptococci.

Differential blood-counts of X-ray workers, carried out for the third year in succession, give no indication that exposure to X-rays causes any pathological changes in the blood.

In the section on dental treatment we are glad to see that inspection of drafts for overseas revealed a marked improvement in the oral hygiene of the trained soldier. This is undoubtedly due to the appreciation by recruits of the instruction given to them on enlistment by dental officers.

Among 603 recruits enlisted in the Western command, the oral hygiene was stated to be good in 13 per cent, fair in 25 per cent, and neglected in 62 per cent.

As regards the medical examination of recruits, 51,288 men were

examined; 325·53 per thousand were rejected on examination, and 17·12 were found unfit within six months of enlistment.

The third section of the report deals with the health of the Army in the various commands at home and abroad. The report from India is of particular interest in view of the number of troops stationed there. As we have already stated, malaria caused the greatest number of admissions to hospital. In the Western command there were 314 admissions per thousand of strength, and in the Northern command 268 per thousand. Lahore was the most malarious of all stations. Experience of many years having shown that it is difficult to eradicate malaria without spending large sums of money, the following measures in order of importance have been approved :—

(1) Withdrawal of troops from malarial stations. In the case of British troops this is stated to be the most effective and least expensive anti-malarial measure.

(2) Fumigation of barracks. This is considered of great importance, as a small number of infected mosquitoes may persist in a barrack-room and infect large numbers of men.

(3) Propaganda. The Rockefeller cinematograph film on malaria has been circulated among malarious stations. Experience has proved that men fully understanding the methods of transmission of malaria can make such effective use of the means of personal protection as to remain free from infection.

(4) Personal protection. The most important method of personal protection is the use of the mosquito net of the approved pattern, 29/30 mesh, made of 30/s cotton, with round or hexagonal holes of equal size. Mosquito nets are used by all ranks during the months of malarial infection.

(5) Anti-mosquito measures. Measures for the eradication of mosquito breeding places and for the destruction of adult mosquitoes are carried out in all malarious stations.

(6) Mosquito-proofing of barracks. This is a very effective but is considered rather an expensive anti-malarial measure. We have already published some communications showing the advantages gained by this method in the British infantry barracks in Lahore cantonment.

In our editorial on the Medical Department of the United States Army in the World War we drew attention to the screening of barracks in the Southern States of America, which resulted in considerable saving of money and increased efficiency of the troops. It might be that the Indian Government would not find screening of barracks such an expensive method if the cost of mosquito nets and of the sick time and loss of efficiency caused by malaria were estimated and contrasted with the necessary expenditure on screening.

A copy of this valuable report should be in the hands of every medical officer, to enable him to obtain up-to-date official information connected with diseases in the Army.

Clinical and other Notes.

NOTES ON A CHEAP STEAM STERILIZER FOR DAIRY CANS.

By MAJOR T. O. THOMPSON.

Royal Army Medical Corps.

IN the average contractor's type of dairy in an Indian cantonment, arrangements for adequate cleaning and sterilization of milk cans and other receptacles are often bad.

The usual method is with alleged boiling water and soda (the boiling

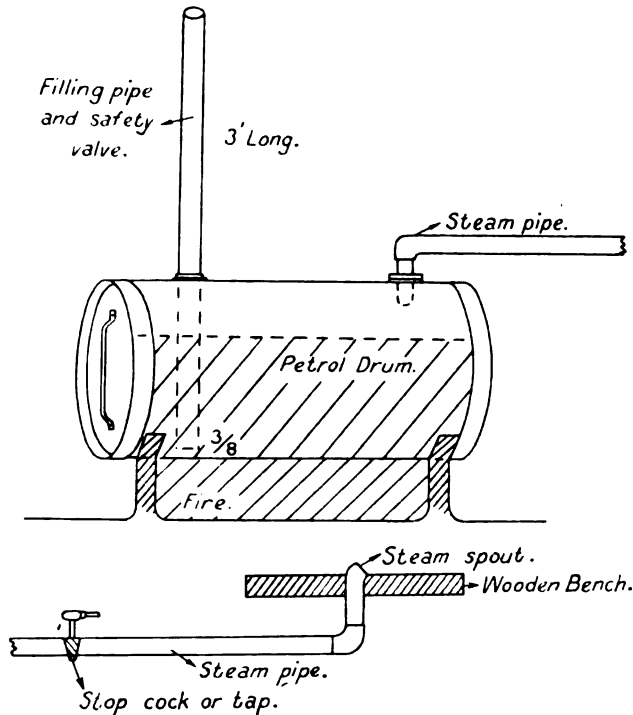


DIAGRAM OF IMPROVISED STEAM STERILIZER FOR MILK CANS.

The steam pipe and filling pipe are screwed into collars which are brazed on to petrol drum. The filler pipe has an internal extension which reaches to within $1\frac{1}{2}$ in. of bottom of drum, and this acts as a safety valve; 3 ft. external height gives a pressure of about $1\frac{1}{2}$ lb. to the square inch. Milk cans for sterilizing are inverted on the wooden bench and steam turned on by the tap. The above is in use in a number of small dairies at costs varying from Rs. 25 to Rs. 55, depending on workmanship and elaborations.

water is sometimes, if not frequently, seen to be quite harmless to the naked hand). This method produces little, if any, real sterilization.

The following simple steaming device has been brought into use in a number of local contractors' dairies in the Meerut district, and appears to

function well, and it is thought that the device may be of use in many other stations where small contractors' dairies are the source of supply. The device consists, as shown in the sketch, of:—

(1) A small boiler made of a petrol or kerosene four-gallon drum, fitted with two pipes which are screwed into brass collars which are brazed into the drum. The filling pipe is three feet long outside and on the inside reaches to within one and a half inches of the bottom. The steam pipe is not prolonged inside the boiler.

(2) Steam pipe with some form of tap or stop cock. This leads through a wooden block or table to a plain jet.

(3) The receptacles are inverted over the jet and steam turned on until the whole receptacle is filled with current steam.

(4) The fire may be of wood or charcoal, or an oil and water drip feed, such as is used in a mule pack disinfector, which has recently been brought into use in this district.

(5) The cost for the various types which have been installed at present has varied from Rs. 25 to Rs. 55, the latter being provided with a metal fireplace, brass taps, and a brass safety valve. The average cost is about Rs. 35.

Some of these steamers have been working successfully for nearly two years, and it is hoped that this explanatory note may be of interest and assistance to others who are engaged in the supervision of the average station dairy.

ANTI-MALARIAL WORKS AND IMPROVEMENTS.

By MAJOR J. E. M. BOYD, M.C., F.E.S.

Royal Army Medical Corps.

THE two recent articles in the Corps Journal, by Colonel N. J. C. Rutherford, D.S.O., A.M.S., and Major A. Campbell Munro, I.M.S., clearly show that a great improvement can be made in the health of troops, when work is properly carried out; it is to be hoped that when additional methods of combating the disease are dealt with in as thorough a manner as the mosquito proofing of buildings at Lahore and Amritsar appears to have been done, even better reports will be forthcoming.

One point which seems to need grave consideration in the carrying out of all these works is the elimination of the possibility of the execution of all schemes and works by local authorities, without reference to higher authority.

Suggestions for such works will undoubtedly be received at Army headquarters with pleasure. It is often not only a waste of money, but also a disadvantage for any such works to be allowed without reference to sanitary experts at Simla.

One almost totally useless work, seen in India, is the mosquito proofing

of only the doors of hospitals and barracks ; yet this was being carried out as recently as 1926, just prior to my coming home.

At the station in which I was serving, the provision of mosquito proof doors was sanctioned for the B.M. Hospital. I pointed out to the officer commanding the hospital that the work was not likely to be of the slightest benefit to anyone, except perhaps the contractor, but was told that the local Colonel Commandant was very keen on the matter, that he had been asking for funds for this work for a considerable time, and having obtained the money had directed that the work should be carried out forthwith.

Not being a recognized specialist in the matter, having given my opinion I could do no more. There is not the least doubt that, following on the excellent results at Lahore, as funds become available, all hospitals and barracks will eventually have the buildings mosquito-proofed.

Would it not have been better to have applied the money so expended to some central fund, to be disposed of at a later date, when the complete mosquito-proofing of the buildings is being carried out?

One has much to contend with in the tropics, when dealing with buildings, especially where woodwork is concerned. Unless the best seasoned wood is used, the extreme ranges of temperature and the dampness during the monsoon, lead to warping. One has also to deal with the human element. The most important idea in the minds of "other ranks," both British and Indian, though contrary to all orders on the subject, seems to be the evolving of some method for keeping mosquito proofed doors open. These methods vary, but usually consist of the insertion of shoes, stones or pieces of wood in the hinged portion, the result being that, as soon as anyone in authority is seen approaching, frantic efforts are made by the guilty persons concerned to close the doors, the obstructing matter being overlooked in the excitement.

As a result the hinges are sprung, the doors cannot be properly closed, and mosquitoes can thus enter the rooms. This state of affairs is pathetic, the room having become a potential mosquito trap.

In the building under consideration, even before the final door had been fixed in one of the wards, there were signs of cracks and badly fitting joints in the doors already fixed. Any idea of peaceful security to the inmates was discounted by the fact that, though the doors had been dealt with, no effort had been made to cover the fanlights immediately over the doors.

I mentioned this obvious oversight to the S.D.O. in charge of the work and he replied that the fanlights were not mentioned in the work he had been told to carry out. He made a note of the matter, but I left the station before I heard the result of his report. Perhaps "no funds were available."

If it was forbidden by A.H.Q. for any such improvements (?) to be carried out without reference to Simla, a uniform and valuable system of anti-malarial work for the whole of India could be evolved and the lesser and inefficient efforts could be killed in their infancy.

Travel.

KULTUR AND KUR IN A COUPE.

By U. P. A.

(1) THE ENTRY.

It was the month of December.

The port of Karachi basked in a blaze of sunshine, but the heat was tempered by a cool breeze which rippled the blue waters at the harbour's mouth.

With deliberation and dignity the big ship swung clear of the dock and headed for the open sea.

With the aid of our glasses we picked him out; he was standing on the edge of the jetty—a forlorn little figure waving a loyal little hand in a final salute. We saw him turn and face his native north: Nabhi Baksh had set out on his quest for a new master.

Gradually the land details faded into the yellows and browns of the fast-receding shore. Before long India became but a mauve strip on the horizon.

Georgina rang up the curtain on the next act. "Let's unpack," said she.

Seven weeks after, in the month of January, we stood on the crest of the Ardennes. Melting snow lay all around. A searching wind bore on its bosom great clouds which descended in icy rain, or wrapped us in a dank and dismal mist.

This was Hallschlag, the German Frontier Post twenty-two miles east of Malmedy where we had spent the previous night.

We were tackled by a couple of truculent Green Policemen.

"Unpack!" said number one, a man with a face like the Crown Prince.

At least, we think that is what he said, for at that time we neither knew, nor understood, a word of German.

"Certainly not!" replied Georgina.

"Unpack!" said number two, a second-rate Ludendorff in appearance.

"We won't!" I shouted, and added something which ought to have reduced him to a cinder.

"Very well," they both answered, "then you can either stay here and freeze, or return to the place you have come from"; and with that they strode into the warmth and shelter of the Customs Post.

A corporal in the field-grey of Flanders strolled up. Probably he was on frontier guard duty. He was a country lad with a broad, bucolic smile. Georgina greeted him affably and said she knew his old mother in Somerset. He was much impressed and advised us to unpack "in order to avoid pneumonia. I'll have a look and let you down easily," said he.

Georgina brightened. Grumbling, I unroped the waterproof sheet and fished out a cardboard box. Georgina displayed three new hats. Field-grey was delighted and asked for more.

The first article in box number two was my blue forage cap, complete. Field-grey examined it with interest. Suddenly his smile faded: he looked intently at me.

"Offizier?"

I nodded vigorously.

"Englischer?"

We both nodded vigorously.

Field-grey clicked his heels, sprang to attention and said: "The Green Police are pigs. As the sole representative of the noble German Army—and therefore, as the only gentleman—in this ghastly spot, I ask your pardon Herr Offizier, and Frau Englischer. Be pleased to proceed."

We scraped the mud off our shoes and climbed, dripping, into the coupé.

The sour-faced G.P. watched from a window, but Field-grey stood at the salute as we sped down the road.

Hunger halted us before a humble gasthaus at Stadtkyll. We asked for coffee and eggs. Neither the old landlady nor her older maid-of-all-work could fathom our demands. Georgina scraped her feet on the bar-parlour floor, flapped her arms in the air, and clucked. In a few minutes there was spread before us a feast: fried eggs, slices of fearful and wonderful sausage, brown bread, butter, jam, pumpernickel and coffee.

In a few minutes more the feast had vanished. Cost, 1½ marks.' I tipped the maid-of-all-work a half-mark. She nearly fainted from joy and gratitude. I've never seen a saxepe more effectually banged.

At mile forty-six from the frontier we entered Mayen—a minor health resort—and put up at the hotel in the square. The travel-stained coupé was garaged in the washhouse. We had a cheerful bedroom, spotlessly clean and very comfortable.

Experience leads one to make certain comparisons and reach certain conclusions. Apart from the big cosmopolitan caravanserais which are equally luxurious, monotonously similar, and terribly expensive wherever they may be, the typical national hotel, or inn, varies a lot in different countries.

Speaking generally, a typical German hotel is cleaner, more comfortable, and fifty per cent. less expensive than a typical French or Belgian hotel.

A typical British hotel is not, as a rule, as clean as a German one, and it is one hundred per cent dearer.

Cuisines are difficult to compare since they are quite individualistic; but, if you have no strong insular prejudices, you will find that the German

' This was in 1926. The mark, stabilized, was worth elevenpence three-farthings.

hotel food is plain and good, well-cooked and ample—too ample—in quantity.

At Mayen supper arrived on a platter measuring twenty-four by eighteen inches. There was veal, sausage, hard-boiled eggs, several kinds of vegetables, pickles and salad all arranged in an artistic pattern on the one dish. With the aid of several glasses of lager we managed to demolish half the viands. A man at a neighbouring table got rid of the lot on his dish, and finished up with a small cheese : not a small piece of cheese, but a small cheese. However, he was a specialist. Before we retired, at 10 p.m., he had polished off nine lagers : by 11 p.m. his score must have been "kolossal."

The run next day was a short one : twenty-four miles to Coblenz, via Andernach. "My Rhineland Journal," by General H. T. Allen, contains a most interesting account of Coblenz and district under the American occupation.

In Germany a commercial town is modern, a picturesque town is mediæval, and an aristocratic one is Roman. The guidebooks are very particular about this and always describe the advent of the Romans with meticulous accuracy. Thus you will read, "Tiberius Valerianus passed through Haggisheim on January 1, 150 B.C. In honour of the day the Pipers of Pan headed the procession, and the legionaries received a special issue of haggis. It is recorded that the Roman officers derived much benefit from drinking the sulphuretted-hydrogen waters which have since made Bad Haggisheim world-famed. This is commemorated in the hot H₂S Spring, known as the Tiberius Valerianus Spring, situated 322½ metres north-east of the kursaal," and much more to the same effect.

The degree of verisimilitude attained by a German guidebook leaves one amazed, and not a little exhausted.

While on the subject of guidebooks it is convenient here to remark that they are lucid, detailed and countless. Hence, in this chronicle it is not proposed to compete with the solemn Baedeker and Co. This account merely aims at supplementing the Baedeker fare.

Dinner was accompanied by an excellent orchestra. .

Georgina was feeling the effects of the Belgian pavé and the arctic conditions in the Ardennes, so she retired early. This was fortunate, as it permitted me to indulge in a detached and undisturbed study of the youth and beauty of Coblenz.

The dining-room was cleared, the orchestra descended from the classical to the negroid, and the night habitués trooped in. The men were nearly all clean-shaven French subalterns who looked ultra-smart in their horizon-blue. The women were not French. Perhaps they were International. They were young, pretty, painted, powdered, and expensively dressed.

The deportment of the subalterns was most correct, and that of the ladies mostly correct.

The favourite dance was a graceful and complicated tango, very well

done. The orchestra dropped the bones and tambourine and played sympathetically; the subalterns were as serious and grave as a platoon marching with arms reversed; the ladies forgot to smoke.

A solemn and artistic performance.

Just as I was really beginning to enjoy myself I discovered that I was paying more for my drinks than anybody else in the room, so I went to bed.

Next morning we crossed the Rhine opposite the great fortress of Ehrenbreitstein, and ran up the valley of the Lahn past Bad Ems and Bad Nassau.

In Germany it is an offence against good taste to omit the "Bad." "Ems" indicates a collection of boxwalks at the bottom of the social scale; but "Bad Ems" denotes purple and ermine.

From Bad Nassau there is a long, stiff climb to an elevated plateau. Thence the road leads over the Taunus Mountains to Bad Langenschwalbach, where the descent into Wiesbaden begins. A run of forty-seven miles.

B. Langenschwalbach is noted for its steel springs (not metallic) and mud baths. The Royal Mud Bath is boomed by means of a picture postcard of the before-and-after-type. In "Before" you see a young lady encased, from the chin down, in thick black mud. She is ill and emaciated; a case of advanced general malaise and chronic cachexia.

In "After" the same young thing is depicted; but this time she is radiant, rosy and buxom, and very proud of the five children—æ. from 1 to 5 years—by whom she is surrounded.

Judging from the frequency with which one comes across this p. p-c., the Royal Mud Bath must be popular with the B.A.O.R.

I once saw a senior member of French G.Q.G. in a mud bath. The stuff is like greyish-black putty and is applied warm. After a certain time it is stripped off in flakes by directing on it a powerful stream of water from a hose. The French *majeur's* explanation was cut short by the old general who, as soon as he realized my interest, gave me a detailed and dramatic demonstration of the whole process. He was an enthusiastic patient, but he had missed his calling; he ought to have been a Professor of Medicine. The fact that he was wearing nothing but a mud stocking made the clinic all the more impressive.

(2) WIESBADEN.

As Wiesbaden is the biggest and most important spa in Europe it was—of course—discovered and frequented by the Romans. In the fifteenth century it possessed two public baths and fifteen hundred private ones. At this period the bathing customs appear to have been modelled on those of Japan, but without the decorum and modesty practised in that country. But for this lapse it has a clean history sheet; it could hardly be otherwise considering that "there are no fewer than thirty-one different salt

springs which yield 1,314 quarts of water per minute, at a temperature of 68-75° Centigrade."

For those who do not care for hot seawater there is the Faulbrunnen, where you may drink it cold.

The kur literature is stupendous. It deals with climate, the various kinds of baths and of NaCl cocktails, the inhalation treatment and the grape course. Cures are guaranteed for eighteen groups and about fifty subgroups of diseases. According to British medical standards most of these diseases are deemed to be incurable; but that does not matter: it only serves to illustrate the hide-bound conservatism of the B.M.A., the G.M.C. and similar die-hard institutions. In this respect our attitude is all the more reprehensible when it is remembered that all we are called upon to do is to prescribe; it is the patients who have to swallow the nasty stuff.

Nor does it seem that enlightenment has followed our arrival. Georgina's views are much the same as those of the rest of the B.A.O.R. One day she complained of rheumatically pains. In casual fashion I said: "You are not drinking enough water." Without any fuss I slipped out and procured a good stiff glass of warm sodium chloride. Georgina thanked me sweetly, swallowed four ounces at one draught, gulped, spluttered and . . . well, it was quite a long time before we were friends again.

The B.A.O.R. does not dislike the local lager; but warm sodium chloride solution is not one of the ingredients of that delectable beverage.

The ordinary water supply of Wiesbaden comes from a subterranean lake buried deep in the bowels of the Taunus Mountains. Access to it is gained by means of a long tunnel in which is laid a set of rails. The inspecting party is conveyed on a trolley which is propelled by pedalling.

It is alleged—I have heard it on good authority—that, prior to the arrival of the B.A.O.R., a certain officer of the R.A.M.C. was detailed to inspect the Wiesbaden water supply. He arrived, spurs and all, at the entrance to the tunnel. He was accompanied by the municipal ober-engineer who was garbed in a frock coat and silk hat.

John, the aforesaid officer, was invited to a seat on the trolley but, being of a sporting nature, he declined the offer and elected to bestride the cycle. Not content with this, he insisted on the ober-engineer occupying the second cycle saddle, and stuffed the professional pedallers into the trolley. John then released the brakes and pedalled like mad. The downhill gradient and the weight of the ober-engineer did the rest. The cycle-combination flew down the tunnel and was stopped on the verge of the lake just in the nick of time. It was a fortunate ending, for a lake of this kind is ill-suited for dredging operations.

To this day the relationship between the military-medical and the municipal engineering services in Wiesbaden is not as cordial as it might be.

One of the curious features of the Occupation is the "draw" exercised by any form of military display. Crowds flock to the church parades, the

King's birthday parade, or to any other function in which our troops are engaged. The fact is that the German is a born soldier, and when a good show is put up—one which makes a real appeal to his martial instincts and traditions—he simply cannot resist it; not even when his old enemy provides the spectacle. The B.A.O.R. does make a creditable display in public, and that is quite enough to make old Fritz forget that he is a God-fearing German and we are sinful, soulless Englishmen. He is a warrior first and a Teuton second, and he rises to the British soldier-on-parade because in him he sees another of his own kind.

On these occasions racialism is routed by the freemasonry of arms.

It is a well-known fact that the members of the B.A.O.R. live in the lap of luxury. Nevertheless, it must not be thought that the splendour is perfection, or the bliss unalloyed.

Georgina and I lived in a four-storied palace, the property of a Jewish banker.

The northern end of the drawing-room was furnished in dark mahogany upholstered in bright green and gold brocade. In the southern end the furniture was pale elm, covered with rose-pink silk.

It was quite easy to orientate oneself in this room.

The pictures were oils: mostly tempestuous seascapes which made one feel ill and shivery to look at. The Archangel littoral, the Baltic in winter, etc. The frames were of massive gilt, calculated to crush you as flat as a pancake had they descended unexpectedly.

The bath was undersized and the tap produced hot water on forty-eight hours' notice.

The Reich "linen" was rather trying. The bed-sheets were scratchy and the table napkins must have been used at one time as Lewis-gun targets. The glasses sparkled when there was liquid in them. The china was passable, albeit mixed. The cutlery was very poor.

In the basement there was a fine billiard-room in which one could conveniently store empty boxes and similar articles.

However—no complaints, provided the "Lap of Luxury" notion is not overdone.

When we were tired of looking at the Archangel littoral, and the Baltic in winter, we used to sit on the balcony overlooking the main boulevard—the Kaiser Wilhelm Strasse—and watch the passing show. Old Fritz and his Gertrud, with a bottle of lager and a bunch of sausages: Rachael and Moses in brilliant, if somewhat too obvious, finery: smart little women from the theatre and opera: invalids, real and imaginary, by the dozen: a party of the Camerons *en route* to change guard at G.H.Q.; every kind and description of British and German motor car. An ever-changing scene of colour and animation.

Officers who wish to foregather go to the bridge-billiard-bar club. For their wives there is a daily eleven o'clock séance at the N.A.A.F.I. In Wiesbaden most of the yarns start thus: "I met Mrs. Smith at the N.A.A.F.I. this morning. She was buying cabbages. She says, etc., etc."

Franco-British race meetings are frequent and popular. There are good tennis courts in the town and a nine-hole golf course four miles out.

The opera house, near the Kurhaus, is a solid flamboyant building. The interior is riotous: gold, silver and crystal; hundreds of lights and a blaze of variegated colours; mural and overhead paintings; statuary, reliefs, coats-of-arms and everything calculated to impress the visual sense.

Add to this a German audience on a gala, i.e., a Wagnerian, night. The effect is brilliant and bewildering. At the promenade-supper intervals you creep into a corner and feast your eyes. Later on, when you become more or less accustomed to the pageantry, you take to a critical study of the details. It is then you discover that the cut and colour of Gertrud's party frock have to be seen to be believed.

The same remark applies to the lines of Gertrud's figure.

Grand opera begins at any time between 4.30 p.m. and 6 p.m., and finishes at 10.15 p.m. During the intervals you can have a light supper in the restaurant, at the rate of one course per interval; or "schnitzens" of smoked salmon, raw ham or sausage at the buffet. If you do not know what to ask for you are always safe with "bier-spezial-hell" or "dunkler": sustaining and, in those parts, not a bit plebeian. In Germany beer is the only thing which is never "verboten."

The operatic performances—for those who like that sort of thing—are splendid; and for those who do not, there is a theatre round the corner which stages modern musical comedy and similar trash. Or, if you are a bloated and foolish millionaire, there are numerous cabarets and night shows of sorts, mostly second-rate.

The "Spezial Kur-Konzerts" by the Kurhaus Orchestra are very good. The conductor is the double of Lord Robert Cecil: his methods are most instructive and entertaining to watch.

Judging from the number of operatic, theatrical and orchestral performances, the singers, actors and musicians must be the hardest-worked people in Wiesbaden.

If you are in search of entertainment, pleasant surroundings and a mild climate: if you wish to rest and recuperate without being bored, Wiesbaden can be recommended.

(3) AROUND WIESBADEN.

The Taunus range forms a protective barrier to the north and east. It is well wooded and contains innumerable beauty spots.

To the east lies Bad Homburg of hat fame, and once a favourite resort of King Edward. It now looks rather shabby and is used chiefly for German State Insurance patients: a panel spa in fact.

To the north is the cathedral town of Limburg, an ancient and picturesque place.

To the south you may travel via Darmstadt, Lindenfels and the Neckar valley, to Heidelberg and Heilbronn.

Darmstadt is a progressive Kultur factory, of more interest to the student than to the casual visitor.

Lindenfels is a small town on the highest point of the watershed between the Rhine, Main and Neckar. It occupies a superb situation amidst the finest hill-forest scenery.

In the early spring we visited this district in the company of John and Co., who travelled in their own tourer.

Snow lay on the higher passes. It was bitterly cold.

Following on a fierce climb the coupé plunged into a gloomy forest of firs wrapped in thick mist, and pulled up at a junction of three roads. Below us we could hear the hum of John's approaching tourer.

Georgina and I scanned the map hurriedly, the tourer emerged out of the mist, we waved it on and, as it flashed past, John bowed in graceful acknowledgment of our kindness—and vanished.

John hates the sight of a map.

Georgina looked at me: I looked at her. Another hurried consultation over the map and our fears were confirmed: we had waved the tourer on the wrong road.

After thirty minutes of break-neck, downhill driving we found the tourer in a peaceful, sunny valley. John was trying to induce the local inhabitants to assure him that it was unnecessary to turn, climb interminably and re-enter the cold and fog of the forest above. However, Georgina and I and the map had to back the local inhabitants.

John was by no means pleased.

By the time we foregathered again at the cross-roads on the summit the mist had lifted, the sun was shining and John, being an Irishman, smiled.

It was on this trip that we had our first tussle with the problem "Strasse Gesperrt!"

"Strasse Gesperrt!" is a legend which surmounts a barrier drawn across the whole breadth of a road. It is the equivalent of our own "Road Up"; but Fritz is nothing if not thorough, so, when he engages in road making, he bars the *whole* road.

When you meet "Strasse Gesperrt!" pull up, locate your position accurately on the map, and trace your new route carefully and continuously until you are once more on the main road, at the distal end of the stretch under repair.

If your map-reading vigilance relaxes for one second and you cannot speak the local dialect, you are done.

John was leading when "Strasse Gesperrt!" was encountered. The tourer was turned into a side road and the coupé followed. The attention of John and Co. was fixed on a stork which was standing in a huge nest perched on top of a farm chimney: as a result the tourer took a wrong turning.

We knew it was a wrong turning because we were watching the map and so missed the stork.

We chased after John, but his speed and dust defeated us ; so we turned back, motored over six miles of the worst road in civilization and halted at a junction where, according to the map, John was bound to pass sooner or later.

At the end of two hours the tourer hove in sight. John was decidedly cross. The map failed to convince him ; three tactful ladies made him waver, and a good lunch caused his capitulation.

Nevertheless, he insisted on laying all the blame on the stork.

Heidelberg is beautifully situated but, with one exception, it is disappointing.

The exception is the famous schloss, a magnificent castle-fortress which is worth going many miles to see.

One wing is called the *Englischer Bau* : built in 1612 by Frederick V in honour of his consort Elizabeth Stuart.

Fritz never tires of illuminations and firework displays. The annual illumination of Heidelberg Schloss is the most popular and renowned of all.

When we were there the great hall was being decorated for a students' beanfeast. The place was bedecked with arms, banners and masses of pine branches—just as it was decorated for the old-time Christmas banquets.

There is in the cellars a cask which looks big enough to float a modern t.b.d. The sight of this enormous receptacle was demoralizing. While the ladies of the party went off on fresh explorations, John and I adjourned to the garden of a riverside hostelry, there to restore our shattered moral.

This inn turned out to be the duelling G.H.Q. Attached to it was a musty, barn-like hall—the students' official *salle d'armes*. The landlord explained that the duels were fought on Wednesday nights and that, if we could remain, he would try to obtain permission for us to see a fight or two. It was then Sunday morning : John said it would be inconvenient but that, if a few really bloody bouts could be staged, we would try to prolong our visit. The landlord must have caught the sanguinary gleam in John's eye for he suddenly apologized, saying that he had forgotten that the students had not yet returned from the Easter vacation.

John was annoyed and forgot to pay for his beer ; however, I repaired the omission.

The university was founded in 1386 and is the oldest in Germany. Its present buildings are ugly : not unlike a collection of old Lancashire cotton mills. It is to be hoped that the interiors are more attractive than the exteriors. A Heidelberg student must refer to his Alma Mater in the abstract : any reference to the concrete is unthinkable.

The cathedral town of Worms is another interesting place : reached by an indifferent road which runs over the vine-clad slopes bordering the Rhine.

In April, 1521, the Reichstag met here in a session at which Martin Luther appeared before the Emperor Charles V in order to defend his thesis of Protestantism.

Luther's statue is a noble work.

In the grounds of the *Liebfrauenkirche* (Church of our Blessed Lady) are grown the vines which produce the famous *Liebfrauenmilch* wine : this is a most agreeable *marque*, without the strong acidity of most of the Rhine wines.

(4) A TOUR.

By the grace of an indulgent C.O. and a sympathetic G.O.C., leave was sanctioned.

In a very short space of time we were armed with numerous passports and permits which authorized us to travel in our British coupé throughout Unoccupied Territory.

Never once were we asked to show any of these documents. This is what usually happened :—

Apologetic hotel-keeper, or inquisitive policeman (gravely) :
"American ?"

Georgina : "Nein."

Interlocutor (sternly) : "Hollander ?"

G. : "Nein. Englischer."

I. (all smiles) : "Ach so ? Engländer ? Gut !"

After that we would be told that we were the first English people to be seen in the place since 1914 ; and "are any more coming ?" Then Fritz would turn to me and discover that I had been in the Ypres salient in 1915, or at Arras in 1918, or something of the kind. This gave an opportunity of comparing notes, and led to interminable yarns and discussions. The Germans avoid the political aspects of the War, but they simply love to talk about its minor tactical and personal sides. One fellow was tremendously pleased because I knew the Isle of Man : he had been a prisoner there for two years and was still full of affection for a certain retired colonel, I.A., who was his camp commandant.

We handed over our billet to the D.B.O. without incurring a heavy bill for damages and losses. Perhaps the D.B.O. thought that people who lived in a palace of that kind could do no wrong : or, mayhap, that they deserved to be let off lightly.

Two small suit-cases went into the dickey and were covered by a stout waterproof sheet. The thermos case, maps, passports, etc., went into the well of the car. Herr Eagelbach, the portier, and his wife waved their hands—and we were off for five open-air, care-free weeks !

En route to the Black Forest.—It was a hot, dusty day in July.

Georgina took the wheel, prepared to test the "splendid automobile roads which make motoring in Germany a delight. . . . The whole country has splendid and well-kept roads leading into the most enchanting districts . . . that afterwards find an indelible place in heart and memory." ¹

¹ Extract from "Travelling in Beautiful Germany" : an official booklet published by the Reichszentrale für Deutsche Verkehrswerbung.

These statements do not contain the whole truth. They are good propaganda. Germany is making strenuous efforts to regain favour as a tourist resort, and the campaign is most successful and intensive in America. But it is a pity that exaggeration and poetical licence are employed so freely: they do not pay in the long run; not with English people at any rate.

Some of the roads are good: some are fair: many are bad and, of these, too many are positively shocking.

A certain amount of road repair work is going on (1926) but not nearly enough. No doubt this is due to lack of funds and will right itself before long.

Some of the worst stretches are shown on the latest maps as main arterial roads. Often we scored by taking to a secondary road, but there was always an element of uncertainty.

The coupé ran on her own springs, without snubbers or "shock-absorbers." That she pulled through without accident is a tribute to British materials, workmanship and design. Of course there were a few punctures and, at the end of the tour, a front hub ball-bearing gave out. But on the road from Frankfort to Hanau, on the Danube Valley road, and on a dozen similar pot-holed, bumpy, boulder-strewn surfaces, the car never dropped a nut or broke a bolt.

By all the rules of strain, stress and torment the little vehicle ought to have been reduced to a heap of scrap iron and matchwood.

A panegyric, German style, on the motor roads of England would be something worth reading; but we lack the Kultur necessary to produce one equal to the subject.

The coupé was headed for Biebrich—where our gunners are—and crossed the great bridge over the Rhine into Mainz.

Mainz is the capital of Rhine-Hesse, and the headquarters of the French Army of Occupation. Various shades of red, from pink to Burgundy, predominate in the buildings. When the city is seen from the right bank of the river, with its base shrouded in mist and its domes and towers wreathed in the soft smoke-cloud above, the effect is charming.

Traffic in Mainz is controlled by French gendarmes. A drive through the city is an unnerving experience for anyone except a French chauffeur because, if you follow a gendarme's directions he glares at you and, if you don't, he makes himself unpleasant. The French chauffeur never experiences any trouble for the simple reason that he never pays the slightest attention to any directions given by the gendarmes.

We then struck south and, gradually ascending, entered Bad Kreuznach on the Nahe.

Here the most prominent features on the landscape are lofty, brushwood screens. Water is pumped to distributors on top of these screens, and flows down the brushwood, just in the same way as khas-khas tatties are worked in India.

As it was a hot day we thought that these erections were part of a colossal thermantidote system. They are not. They are instruments of Kur.

The water, in its descent in a finely divided spray, is supposed to impregnate the atmosphere with radium-ozone emanations, while you, if you are a patient, walk about and sniff.

On discovering this, Georgina and I sniffed and inhaled vigorously. I, the optimist, felt tuned up at once: but the more practical Georgina said she could not smell anything but engine oil and suggested a change from second to top gear.

Bad Münster-am-Stein is close to Kreuznach. Near it is the old schloss of Ebernburg, crazily perched on the peak of a high, coniform rock. The building is in two portions, connected by a stone bridge which spans a very deep cleft in the rock. In olden times this bridge-in-the-clouds was found to be an excellent place from which to throw dangerous prisoners, income tax collectors and similar undesirables.

The valley now opens out and the road winds among the vineyards of the Pfalz. There are few trees, but cliffs and crags break the monotony of the hillsides.

Otterberg is a big village connected with the wine industry. Its streets were dirty. The visitor who sees only the spas and show towns in Germany gets the impression that the whole country is as clean as a new pin.

He will revise his opinion if he visits the agricultural districts—except on a Saturday afternoon.

On Saturday afternoon everybody turns out and cleans his own strip of pavement and street.

But—see a farming village on Saturday morning!

After a run of seventy-three miles the coupé entered Kaiserslautern.

This town is like Preston or Paisley: stamped by commerce and industry: and the stamps are not pretty. The only bright spots to be seen through the smoke are the uniforms of the French officers: their brilliance is startling in the general atmosphere of grey, brown and black.

We could find no seats or signs of Kultur, although we tramped the stuffy streets for two perspiring hours.

The best hotel is not too comfortable: it caters for "commercial"—not for tourists. Georgina shied at a mushroom omelette which was flavoured liberally with onion. She explained that she loathed onions, so the waiter removed the dish and returned with mushrooms cum onion and no omelette. A third attempt produced omelette cum onion and no mushrooms. The net result was that I had double rations all round, while Georgina called me a pig, the waiter a lunatic and Hugo's German Reader a monument of ineptitude.

It was a heated evening.

July 15 was very warm and sultry. I longed for my Indian hot weather clothing. We set out to cover eighty-one miles, the first sixty of which lay over roads which were in a wretched state.

Through the Pfalz to Neustadt: thence to Landau.

Landau was *en fête* for the French Republican anniversary celebrations. Venetian masts and bunting, decorated grandstands, banks of flowers, masses of greenery.

No doubt old Fritz and his Gertrud enjoyed the military part of the show: but the oft-displayed legend—"Liberté, Egalité, Fraternité" has no place in Teutonic Kultur. Nor does it make strong appeal to the Anglo-Saxon. An eminent French officer once said: "In France there is so much equality that there is no liberty; in England there is so much liberty that there is no equality!"

Hereabouts the whole district is one great vineyard; colour, a light blue-green which looks well at a distance but which, at close quarters, is seen to be due to a spray of copper sulphate solution. Vines, ground, men, animals and carts are all of the same blue-green colour. It is impossible to imagine anything more uniform, penetrating and all-pervading than this azure spray.

Coming to Kandel we entered the Bien Wald.

The shade of the forest was most welcome.

The car was turned into a cool clearing off the road and we settled down to the usual wayside tiffin.

Georgina had buttered the rolls and was manipulating the cheese; I had opened the bottle of *spezial-hell*—when there arose a loud sizzling hum and, in the twinkling of an eye, we were assailed, overwhelmed and devoured by thousands of the biggest, most vicious and most voracious mosquitoes I have ever encountered.

It was an *offensive à l'outrance* carried out by battalion after battalion of first-class storm-troops.

Georgina dropped the edibles and sprang to the wheel. I gathered up the fragments and steadied the beer bottle between my bleeding ankles. The *coupé* raced through the accursed wood at 45 m.p.h. until, on a sunlit, baking bit of road we pulled up. Free—but at what cost!

It mattered little that the tiffin was scattered over the floor of the car and the *spezial-hell* was flat.

It mattered a great deal that we were covered with bites which irritated to such a degree that, for the next couple of hours, we suffered severely.

The effects of these bites persisted for about ten days.

Compared with the Bien Wald monster, the Oriental mosquito is an amateur.

At Maximilianau a bridge of boats carries both road and railway across the Rhine. The last sentry-box in the French zone stands at its western end. A sector of the bridge was open to allow of the passage of three strings of deeply laden barges in tow of powerful tugs. These convoys were moving up-stream and took forty-five minutes to clear the bridge.

On the right bank of the river stands Karlsruhe, the capital of Baden: a fine modern town with important industries and every adjunct of Kultur.

While Georgina was shopping, three frock-coated, silk-batted gentlemen made a thorough inspection of the coupé. "Achs!" and "Sos?" filled the air and detailed entries filled their notebooks. No doubt they were connected with the automobile industry, and I thought the incident was a good example of the way in which Fritz seizes on the main chance.

(To be continued.)

Current Literature.

- i. MINISTRY OF HEALTH. Reports on Public Health and Medical Subjects. No. 44. **Acute Rheumatism in Children in its Relation to Heart Disease.** Pp. xii + 99, 5 diagrams & 3 figs. on 2 pls. 1927. London: H.M.S.O. [1s. 6d.].
- ii. FENTON, J. **A Scheme for the Prevention and Treatment of Acute Rheumatism and its Complications.** *Med. Officer.* 1927. v. 38, 81-3.

i. No doubt everyone interested in public health will obtain a copy of this report which gives an excellent summary of the present position. It is, therefore, only necessary to pick out a few of the striking points. Heart disease is now relatively, if not actually, more prominent as a cause of death. At the same time, there is evidence that acute rheumatism is less virulent in type. No precise evidence of case to case infection is given, but one estimate shows that rheumatic infection attacks several members of a family as commonly as does tuberculous infection. Very varying estimates are put forward of the frequency of premonitory symptoms among school children. The value of tonsillectomy is discussed. This problem is complicated by the late appearance of first recurrences. Thus according to one observer only 5 per cent. of the first recurrences developed within 4 years of the first attack of rheumatic fever. Acute rheumatic arthritis is said to be "rare under four years of age, extremely rare under two years."

One of the most interesting features of the report is the study by Dr. (Mrs.) M. FOREST-SMITH of rheumatic children living in their own homes and treated as out-patients in St. Thomas' hospital.

Of the children under 12 coming under the purview of St. Thomas' Hospital during 1926, only 34 could be admitted as in-patients, while 14 were sent to other hospitals; and 68 with more chronic conditions were sent to special institutions. The remainder, which had to be treated at home, was 392 or 77·2 per cent.

Dr. FOREST-SMITH gives particulars to show how utterly futile is the out-patient treatment of these children. For example, 44 per cent. who were observed for over 2 years had had 2 or more relapses, and about the same proportion had developed cardiac disease. This gives us some indication of the shortage of hospital beds. As Sir George NEWMAN puts it

in his preface, for every child fortunate enough to be admitted as an in-patient, there may be 4 children who need in-patient treatment and who do not get it. Home treatment for the hospital class is only suitable for the latent or quiescent state of the disease.

Dr. J. E. A. UNDERWOOD, of the Board of Education, reviews the special schools which have been used for rheumatic children. Day and residential open-air schools are ruled out as unsuitable, so also ordinary convalescent homes. The life is "too strenuous and too happily energetic." Special residential schools of recovery are therefore needed, and the education carried on must be free from the spirit of competition. On the other hand, rest must be suited to the individual case and the danger of manufacturing juvenile valetudinarians avoided.

Dr. EASTWOOD supplies an impartial article on the bacteriological order. Most of the report is the work of Dr. J. Alison GLOVER, who was also an advisory member of the British Medical Association Committee. Sir George NEWMAN, in the preface, stresses the importance of getting hold of the cases early. The scheme for the establishment of rheumatism supervisory centres is in substantial agreement with that recommended by the British Medical Association Committee. These centres would be established at hospitals. The cases would be sent to the centres, it is to be hoped at an early stage, by school medical and child welfare departments and by general practitioners, and would then receive the treatment which they needed whether in hospital or in a residential school of recovery. A register would be kept at the Centre of all cases. When well enough to be at home they would remain under supervision and come up for periodic examination. Better instruction of parents, teachers and all health workers in the early signs and symptoms of rheumatism would be an essential part of the scheme. An increased number of hospital beds would have to be devoted to acute cases and residential schools of recovery would have to be established in all parts of the country. The Ministry report describes the Birmingham scheme, based on the Baskerville residential school, as one which could easily be made complete for Birmingham. The Borough of Paddington has established a scheme with a centre at Paddington Green Children's Hospital.

ii. Dr. Fenton, the Medical Officer of Health of Kensington, describes a similar scheme which is to be established for his borough with the centre at the Princess Louise Hospital for Children. In connexion with this scheme it is proposed to make acute rheumatism a notifiable disease in Kensington for 3 years from October 1st, 1927. [When several of these schemes have been established we shall obtain exact information as to the number of hospital and residential school beds required, a subject which is discussed vaguely in the Ministry's report. It is of course well recognized that opportunities for research as to very many debatable points will also be furthered].

H. SCURFIELD.

Reprinted from "Bulletin of Hygiene," Vol. 3, No. 1.

STATUTORY RULES AND ORDERS, 1927. No. 718, Public Health, England. **Notification and Treatment of Endemic Disease. The Kensington (Acute Rheumatism) Regulations, 1927, dated July 30th, 1927.** 4 pp. 1927. London: H.M.S.O. [1d.]

These regulations are issued by the Ministry of Health in connexion with the first complete municipal scheme for dealing with acute rheumatism, which is referred to above by Dr. James FENTON (M.O.H. Royal Borough of Kensington). Acute rheumatism will be compulsorily notifiable by medical practitioners on the usual terms in Kensington for 3 years from October 1st, 1927. "Acute rheumatism" is defined as: (1) Rheumatic pains or arthritis, if accompanied by rise of temperature; (2) rheumatic chorea; and (3) rheumatic carditis, whether these conditions occur separately or together, in a child under the age of 16 years. After receipt of the notification, the duty of the M.O.H. is to investigate the source of the disease, to remove harmful conditions and arrange for the treatment of the patient.

The borough council is empowered to establish a rheumatism supervisory centre and to make arrangements for the supervision, after-care and treatment of notified cases.

H. SCURFIELD.

Reprinted from "Bulletin of Hygiene," Vol. 3, No. 1.

ZIMMER, A. Rheumaforschung und Rheumabekämpfung. [**Rheumatism: Prevention and Research.**] *Muench. Med. Woch.* 1927. v. 74, 1285-6. [3 refs.] [Surg. Clinic, Univ. Berlin.]

Dr. Zimmer shows that it is only in the last few years that public opinion has been roused to realize that rheumatic disease is as important and does as much harm to the community as tuberculosis. The first awakening was due to the publication of statistics by the English Ministry of Health which showed that one-sixth of all invalidity in England was due to rheumatism.

In November, 1925, the Royal Society of Medicine and the International Soc. of Medical Hydrology held a congress in London and an international committee was formed to further research work in rheumatic diseases. Most of the civilized countries had representatives on this committee by 1926. Germany besides being represented on the international committee, has formed a society of her own for fighting rheumatism and Dr. Zimmer gives a description of its activities and those of other societies and follows with a list of recommendations on the lines of which he would like to see the national fight against rheumatism carried on. Among other things he advocates the earliest possible diagnosis and treatment, separate hospitals, convalescent homes and spa treatment, education of the public in personal hygiene and as to causes of rheumatism and its dangers, a better education of doctors and increased activity in scientific research. He also urges

that after-care committees should be formed on the lines of the after-care committees for consumptives to find suitable recreation, interests and paid employment for those patients still in institutions (with special endeavour to strengthen the will to recover and the will to work) and to find work and education for those who have left hospital but are not able to follow former occupations.

Dr. Zimmer goes on to point out the discrepancy between the amount of hospital treatment available in Germany for rheumatism and for tuberculosis. He shows that in the northern states of Germany there is more invalidity caused by rheumatism than by tuberculosis, while the amount of hospital treatment available for rheumatic patients is much less in all the States. This apparent anomaly may be due to the higher death rate caused by tuberculosis, but sickness pay is probably only necessary for a short period for the consumptive (his expectation of life being short) while the rheumatic may live for years in receipt of sickness benefit.

H. SCURFIELD.

Reprinted from "Bulletin of Hygiene," Vol. 3, No. 1.

ROWLANDS, M. J. **Rheumatoid Arthritis: is it a Deficiency Disease?**
Proc. Roy. Soc. Med. 1927. v. 20, 1711-28. (Sect. Comparative Med., 41-58), 19 figs. [1 ref.]

Prolonged investigations into the aetiology of rheumatoid arthritis over many years has led the author to no definite conclusion, except that the blood, joints and tissues of these cases are always sterile, which is strongly in favour of the disease being of toxic origin. Examination of the urine of a 100 cases has revealed that 96 per cent. have a bacilluria, in 89 cases *B. coli* being grown, as compared with 40 normal medical students, showing a 10 per cent. incidence of *B. coli* bacilluria. X-ray examinations in rheumatoid arthritis show that a distended colon and a delayed expulsion are the usual conditions in the alimentary tract. Investigations were then commenced on rats fed on diets with a partial deficiency in vitamin B, and a *B. coli* bacilluria was found in 9 weeks deficiency rats. When these rats were chloroformed they showed complete absence of the normal peristalsis, a great increase in the abdominal fat, and sections of the cæcum and colon showed marked atrophy of the whole structure. X-ray evidence was obtained of a marked dilatation of the stomach and colonic stasis in the deficiency rats. These rats when fed on various bacterial emulsions showed on examination evidence of bacteria in the villi, glands and lacteals of the intestine, but there were no organisms in the blood. Animals died of an acute toxæmia rather than a septicæmia. The author considers that the absence of peristalsis in vitamin B-deficient rats is due to a paresis of nerve supply followed by muscular atrophy and distension which results in an absorption of toxin.

Rheumatoid arthritis, so clinical evidence suggests, is probably of trophic

origin, since *specific groups* of muscles are wasted, and not all the muscles concerned with the diseased joints. The one symptom constantly present in vitamin B-deficiency is paralysis, and the author considers that since rheumatoid arthritis is a disease of civilization, the determining factor in its origin is a vitamin B-deficiency, which allows a toxæmia of alimentary origin to take place. On the basis of the latent period in rats before the development of symptoms, it is estimated that in man the partial deficiency would begin to cause symptoms between the ages of 40 and 50 years, the period when rheumatoid arthritis has its greatest incidence. The author's treatment of the disease is therefore summed up in: (1) a thorough search for all foci of infection, which should be removed as far as possible; (2) vaccine treatment against the type of infection, and above all: (3) an excess vitamin B diet. There is no doubt that there is a real deficiency of vitamin B in the modern diet, a deficiency which can best be remedied, at present, by the addition of detoxicated wheat embryo (4 per cent. in the author's opinion) to the diet. In a number of cases of high blood pressure, associated with a *B. coli* bacilluria, the author has obtained striking results by the administration of a vaccine and a vitamin B-excess diet.

H. N. H. GREEN.

Reprinted from "Bulletin of Hygiene," Vol. 3, No. 1.

Seasonal Prevalence of Tularæmia. *United States Public Health Service.*

Seasonal incidence of cases of tularæmia, according to the United States Public Health Service, is due to the seasonal variation of three sources of infection, tick bite, fly bite and the dressing of wild rabbits, but owing to the overlapping of these influences, cases have occurred in the United States in every month of the year. The great reservoir of infection and the greatest source of human infection from tularæmia is the wild rabbit, jack, cottontail and snowshoe varieties, but owing to the agencies of blood-sucking insects common to rabbits and man, we find cases resulting from tick bite and fly bite.

Of the rabbits offered for sale in the Washington, D.C., market in the winters of 1923, 1924 and 1925, Dr. Edward Francis of the Public Health Service examined the livers of 1,000 and found nine, or slightly less than one per cent, infected with tularæmia. The liver and spleen of an infected rabbit are studded over the surface with small spots varying in size from that of a pinpoint to one-sixteenth inch in diameter. Of 22 cases of tularæmia in Washington, 17 of the patients had dressed wild rabbits bought or sold in the market, 4 had dressed rabbits shot nearby, and 1 had dressed a rabbit which he had killed with a club.

Four hundred and twenty cases of tularæmia have been reported of which seventeen have died. This places the mortality at about four per

cent. These figures embrace only the cases which have been reported to the Public Health Service, but considering the newness of the disease, they probably represent only a portion of the actual number of cases and deaths.

Cases have now been reported from Japan, from the District of Columbia and from thirty-seven States; the nine north-eastern States being the only significant portion of the United States in which cases have not been recognized.

As a rule when the infection has come from a rabbit some injury has been inflicted on the hand while dressing the rabbit, although a manifest injury is not necessary for infection to occur. Usually an ulcer develops at the site of infection accompanied by enlargement of the lymph glands which drain the ulcer. Fever is always present and continues for two or three weeks. The site of infection from tularæmia may be located on any part of the body other than the skin of the hands, if due to tick bite or fly bite. The diagnosis of tularæmia is confirmed by a blood-test. One attack confirms immunity in man. Rest in bed is the most important treatment. The enlarged lymph glands should be opened only after pus has definitely formed.

The infection has never been found in nature in domesticated rabbits raised in rabbitries.

No preventive vaccine or curative serum has yet been perfected, nor has any special drug been found effective against tularæmia.

Rabbit meat thoroughly cooked is harmless for food, and it has been found that a temperature of 56° C., or 133° F. kills the germ of tularæmia. The ordinary disinfectants are effective. Rubber gloves should be worn by those who dress wild rabbits. Immune persons should be employed to dress them where possible. Infected rabbits, kept frozen for thirty days, have been found to be free from infection. Market inspection of rabbits is impracticable, because only about ten per cent of the rabbits found in the market still have the liver in place.

Beware of the wild rabbit which the dog or cat has caught, or which a boy has killed with a club—it is probably a sick rabbit. The hunter should not shoot his rabbits at the point of his gun. Let him be a sportsman and shoot them on the run at seventy-five yards, say, and the chances will be lessened that the rabbits he bags will be sick with tularæmia.

Reviews.

A POSTSCRIPT TO THE RECORDS OF THE INDIAN MUTINY. By Lieutenant-Colonel G. H. D. Gimlette, C.I.E., I.M.S. London: H. F. and G. Witherby, 326, High Holborn, W.C. Price 10s. 6d.

Colonel Gimlette has tackled the history of the Sepoy rebellion from a new angle. His book is an account of the fortunes, or misfortunes, of each regiment of the Indian Army that mutinied. He gives each in detail, its station and the officers that belonged to it, and describes its subsequent career as far as this can be traced. So his book will be of value both to the historian and the individual who wishes to look up the fate of any particular unit. Colonel Gimlette arrived in India only twenty years after the final crushing of the revolt. He met many sepoys who had been involved, but they were conveniently reticent on the subject of the Mutiny. And no wonder.

No one, I presume, even an Oriental, can properly fathom the sea of misunderstanding and panic that overwhelmed the Company's forces. As Colonel Gimlette says, the great majority of the mutineers, being Hindus, could not have had any great enthusiasm for a re-established Mahomedan Empire ruled over by the almost imbecile old Padishah of Delhi. The pathos of it appears where units went into action with the British colours flying and their bands playing the regimental marches; the regiments were unchanged—save for six or seven slaughtered British officers.

I read the Mutiny fairly deeply while in India before the war. I wish Colonel Gimlette's book had been available then. Impressions are not changed by reading it now. The teaching of the Mutiny is that where there were strong, vigorous-minded men in command of stations, no outbreak occurred. Weakness and vacillation played up to mutiny. A few more John Nicholsons, and the unrest would have died out in a short time. There is the lesson, let us hope that it has been learnt. We have weathered a war ourselves; we know what it means. So the tale of the Mutiny may not thrill as it did. At the best, it is sad reading; and there is much grim reality of unrelenting war to the knife (or the cannon's mouth) that one frankly does not wish to read at the present day. I say this because Colonel Gimlette's book may not find the immediate support that one should expect for so careful a work. But it will last as an authoritative record of the fate that befell the units of the Indian Army, and is a remarkably useful addition to the bibliography of one of the most cryptic of military revolts.

M. B. H. R.

FROM THE LOG OF AN OLD PHYSICIAN: STORIES AND SKETCHES. By X. Y. W. London: Selwyn and Blount, Ltd., 6, Duke Street, W.C. 2. Price 2s. 6d.

This book contains fourteen short stories, all connected with the everyday life of a physician and the individuals with whom he is brought in contact. They have a serious aspect about them, and are extremely well written. Obviously, the author understands the art of the short story. He is one who retired at the age of 65, and the stories were put down in his "log" during the earlier days of his practice. And they are not fiction; they are the true experiences of a doctor, though names and places have been altered.

I like these stories. They are interesting and crisp. It is uncommon to find thoughtful short stories in this epoch of light literature. R. O., who wrote them, is to be congratulated on the manner of his writing. And a little touch of the serious is not a bad thing. M. B. H. R.

MALARIA IN INDIA. By Major-General Sir Patrick Hehir, K.C.I.E., C.B., C.M.G., M.D., I.M.S. (Retired). London: Humphrey Milford, Oxford University Press. 1927. Pp. 490. Price £2 2s.

This treatise contains in a very readable form a considerable amount of practical information which should be of great assistance to medical officers engaged in anti-malaria work in India.

Part I deals fully with the endemology, epidemiology and ætiology of malaria in India. The figures quoted show forcibly the very high incidence of the disease in that country. The geographical distribution is demonstrated by a colour map by Colonel S. R. Christophers which is most instructive.

The chapters on Indian anopheline mosquitoes will be found to be clear and concise. They deal with the classification, the anatomy and the recognition of the species of adult mosquitoes. There is included also a good condensed synoptic table of Indian species of Anophelini, by Lieutenant-Colonel Clayton Lane, I.M.S., from Colonel Christophers' work on Anophelini.

In *Part II* the clinical and pathological effects of malaria in India are discussed. The life history of the parasite and the relation of malaria to other infectious diseases are carefully explained. One is pleased to see stress laid on the importance of clearing up the diagnosis of fevers of obscure origin and that the writer advocates the procedure laid down by the Army Authorities in India.

Methods of prevention of malaria in India are dealt with under three headings:—

(i) *Legislation*.—Many antimalaria workers will be in complete agreement with the writer's view that "while it is useless to attempt to enforce a complicated legislation upon a people, who are not educated up to a

comprehension of the reason for the laws instituted, the antimalaria sanitarian should have the support of the law in his undertakings." Further it is mentioned that antimalaria legislation is required to prevent any interference with natural drainage by contractors, engineers and builders. Those who have been sanitary officers in India will appreciate the importance of this point.

(ii) *Quinine in Malaria*.—This deals not only with the pharmacology of cinchona alkaloids, the methods of administration, the question of their absorption and elimination, and standard courses of treatment, but also with the all-important economic problems connected with quinine in India.

(iii) *Methods of Protection against Adult Mosquitoes*.—Practical and feasible methods to meet requirements are detailed.

The book contains coloured illustrations of mosquitoes, which will be found to be most helpful. The plates are from Byam and Archibald's "Practice of Medicine in the Tropics," and also from James and Liston's "Anopheline Mosquitoes of India," second edition. J. C. L. H.

MANUAL OF SURGERY (ROSE AND CARLESS) FOR STUDENTS AND PRACTITIONERS. By Albert Carless, C.B.E., M.B., M.S.Lond., F.R.C.S., and Cecil P. G. Wakeley, F.R.C.S.Eng., F.R.S.Edin. Baillière, Tindall and Cox. 1927. Pp. xii + 1544. 19 Coloured Plates. Price 30s. net.

In this edition the name of Mr. Cecil Wakeley appears as in full collaboration. Dr. E. ff. Creed has been responsible for the revision of the pathological sections of the opening chapters, and Dr. Playfair for alterations in the section on anæsthesia.

Many obsolete methods of treatment have been excluded, and subjects better incorporated in other textbooks would appear to have been well sacrificed. The operation of disarticulation through the knee-joint, described in the eleventh edition as a very useful and valuable proceeding, and the treatment of the apparently drowned, might be given as examples of these deletions.

There are numerous revisions and rearrangements. New diagnostic and therapeutic methods which have been added include: intratracheal and subarachnoid lipiodol injections, ventricular and cisternal puncture, and cholecystography.

Some of the subjects introduced or modernized, are: cleft palate, tumours of the spinal cord and meninges, treatment of appendicitis, hernia and varicose veins, and avulsion of the phrenic nerve in the treatment of pulmonary disease. Where descriptions are necessarily brief, references are given. There is a general improvement in the illustrations by replacements and additions.

The work, in short, has been thoroughly revised and brought up to date, happily, with the reduction of a small number of pages, and the authors are to be congratulated on their latest production.

The twelfth edition can be recommended to the Army medical officer—specialist or otherwise—as an excellent book of reference ; to the fellowship student as a most useful basis of study ; and to the officer abroad, isolated from his colleagues, as perhaps an essential.

TREATMENT BY MANIPULATION. By A. G. Timbrell Fisher. H. K. Lewis and Co., Ltd. 1928. 62 illustrations. Pp. xii + 200. Price 9s.

This work was originally published under the title of "Manipulative Surgery." The appearance of a second edition, after a comparatively short period, is in itself evidence of the standard of utility to which this work has attained. In the present edition many parts have been re-written and enlarged and a good deal of new material has been added. In Chapter II a section dealing with manipulation and other forms of surgical treatment in chronic (non-tubercular) arthritis has been added. Chapter III has been augmented by the addition of a valuable section on the simulation of tubercular disease by traumatic articular adhesions. The section dealing with osteopathy has been enlarged and a new section on the cult of chiropractic has been added. The sections dealing with tennis elbow and lesions of the sacro-iliac joint have been considerably enlarged. In dealing with manipulation in cases of mal-united Colles's fractures it is regrettable to note that the author makes no mention of the use of a Thomas's wrench, as advocated by Sir Robert Jones. The book is well written and is an enunciation of sound surgical precepts, which are clearly stated and illustrated by interesting case-histories. It should deservedly hold its own in popularity as a most useful guide, not only to specialists but also to general practitioners. It will be of special interest to military surgeons, who so frequently come across the type of case with which this book deals.

D. McK.

THE COMPANY OF ADVENTURERS. By John Boyes. London : *East Africa*, 91, Great Titchfield Street. Price 16s.

Old campaigners will thoroughly enjoy Mr. John Boyes's new book. Especially will they appreciate the yarns told round the camp fire by the jovial party of elephant hunters who foregathered with the author at Lado, on the Nile, and raided the Enclave. They were a mixed crowd and a tough crowd, but even ex-President Roosevelt, who visited them, enjoyed their company and left them with regret. The one man who could handle them was the District Commissioner, Hannington, son of the Bishop who was murdered by Baganda, and the author's tribute to this officer is sincere and generous. The brief biographies of the more remarkable of the "boys" are delightfully humorous.

Mr. Boyes, known far and wide in East Africa as "King of the Wa-Kikuyu," is a second Allan Quartermain for a love of adventure, with that hero's knack of dealing with natives and resource in critical situations.

He tackled cannibal tribes, Nubian deserters, German officials, Abyssinians and elephants with equal skill, tact and success. He scouted for a British expedition and guided a British Governor on a *safari de luxe*; and he tells his tale with a restraint, modesty and veracity which must appeal to all.

Like most explorers, he had a good deal of amateur doctoring to do. He cured an old Madi of snake-bite by dosing him with whisky, but another similar case had a grimly humorous sequel. Having shown the Natives how to cut and bleed the wound made by the snake's fangs, he left his patient in their hands. Returning after a month's time, he discovered to his horror that they had improved on his treatment and had amputated the leg above the knee! He notes that Abyssinians suffer greatly from tape-worm owing to their custom of eating raw meat and that they have a remedy, the wild male fern. He describes the Kikuyu method of treating wounds, and found a weak solution of permanganate a good cure for sore eyes. He discovered that a sole diet of milk agreed with him and his companions surprisingly, and he managed to survive without water for four days!

This is a book not only to buy, but to keep. Its value as history will increase with the years.

ZUND-BURGUET ELECTROPHONOIDE TREATMENT. By Macleod Yearsley, F.R.C.S. London: William Heinemann (Medical Books), Ltd., 1927. pp. viii + 108. 5s. net.

This is a method of re-education of the ear in cases of deafness which do not yield to ordinary methods. By means of a somewhat elaborate and costly apparatus, invented by M. A. Zund-Burguet of Paris, the whole of the range normally heard is imitated by the vibrations of induction coil armatures, and transmitted by means of a telephone to the patient's ear in such a manner as to combine an appreciable mechanical vibratory effect with the transmission of sound.

The treatment is lengthy; four minutes once or twice a day is required; after twelve sittings, hearing tests are carried out, and it is then possible to say whether or not treatment is likely to benefit the patient. If improvement is definite, a further week's treatment is given, and so on, whilst improvement continues.

The effect of the treatment is partly to stimulate the discouraged nerve fibres of the cochlea by preventing their disuse; partly an hyperæmic-induction which serves to nourish an ear tending to atrophy; and partly a loosening of the stiff ossicular joints. Some of the effect is probably psychological.

We have had no experience of the apparatus, but according to the author, there is undoubtedly for some cases a very real benefit in the treat-

ment, and therefore no deaf person should be considered incurable till a trial of this treatment has been made.

Unfortunately the apparatus is costly and the number of treatments required are so many as to prevent the majority of cases, i.e., those among the poorer classes, from deriving what benefit might be got from such treatment.

THE EARLY DIAGNOSIS OF THE ACUTE ABDOMEN. By Zachary Cope, B.A., M.D., M.S., F.R.C.S. Fifth Edition. London: Oxford University Press, Humphrey Milford. 1928. Pp. xiv + 244. Price 10s. 6d. net.

The fact that in seven years this book has reached its fifth edition is in itself sufficient proof of its value and great popularity as a guide to the diagnosis of acute abdominal conditions. In the present edition the account of the symptoms of peritonitis together with their causation and variation has been amplified. A small section dealing with retroperitoneal conditions has been added but otherwise little alterations or additions have been made. In dealing with the perforation of gastric and duodenal ulcers we think it is a pity that the author still persists in the statement, which appeared in former editions, that the stage of shock may last but a few minutes or persist for an hour or two. In our experience we have never seen it persist so long. A statement such as this is apt to mislead the inexperienced practitioner into looking for the signs of shock, i.e., a rapid and feeble pulse, and on failing to find these he may postpone operation at the time which is most advantageous to the patient. We therefore think that more emphasis should be laid on the fact that the average case when first seen does not present the clinical signs of shock. With this single exception we consider the book to be extraordinarily sound and thoroughly practical, and we can strongly recommend it to those who are interested in this subject. It is undoubtedly the best modern book on the diagnosis of the acute abdomen.

D. McK.

Correspondence.

INSPIRATION.

TO THE EDITOR OF "THE JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—Most of us are liable at times, I imagine, to sudden flashes of inspiration. These flashes usually occur whilst the mind is at rest and without conscious thought or effort on our part. The mind being quiescent, something strikes the eye and instantaneously calls into existence a new train of thought, a fresh conception or a vivid impression.

It may, perhaps, interest your readers if I give some brief particulars of an instance of this kind—an instance from which I have since derived considerable benefit from a professional standpoint.

Shortly after the Stationary Hospital, Potchefstroom, had opened for the treatment of sick (see JOURNAL OF THE ROYAL ARMY MEDICAL CORPS for December, 1927), I was sitting in my office one morning when I heard a slight sound. Glancing up I saw a young and distinguished looking lady standing at the door and holding by the hand the dearest little boy of three. She said, "May I come in?" and I answered, "Yes, of course." As we shook hands I said, "May I ask whom I have the honour of addressing?" She said, "My name is Mrs. R—, but you will probably recognize me more easily if I say that I am the granddaughter of A— P— (mentioning one of the most distinguished names in the Transvaal). I asked, "What can I have the pleasure of doing for you?" She answered, "This is my only baby and for some time he has been so poorly that I feel seriously alarmed about him. As you know all the Dutch doctors are away on commando, and so I have come to you to ask if you will kindly help me." I said, "Of course I will help you, Mrs. R—, it is part of my duty to do so."

As I bent over to examine him, the boy looked up at me and in the brilliant sunshine I saw at once that his nasal mucous membrane was dry, glazed, and encrusted with tiny islets of dried secretion. Instantaneously and without conscious thought on my part the whole sequence of events (namely, absence of secretion, irritation, irritability, sleeplessness and shattered health) and the requisite line of treatment flashed into my mind.

Sending for a camel's hair brush and a small tin of vaseline I showed the mother how to thoroughly lubricate the entire mucous membrane and said, "Do this carefully night and morning for a week and then bring the boy to me again." Seven days later she returned looking supremely happy, to say that her boy was quite himself once more and to beg that she

might be allowed to do something for the hospital as a mark of her gratitude.

Inspiration may be too flattering a term for this trifling incident. Be that as it may, however, I have since then repeatedly used vaseline with marked benefit in dry conditions of both the mucous and cutaneous surfaces.

I may, perhaps, mention another incident in the same connexion which, although it has no direct professional significance, was distinctly gratifying. On St. Patrick's Day, 1901, I was sitting at an early breakfast when I saw Mrs. R—— and her boy approaching. They came into the mess to speak to me and the boy handed me a tiny packet "with my love." On opening it I found it contained a lovely spray of shamrock beautifully worked by hand in green silk. Mrs. R—— knew I was an Irishman. She also knew that I could not obtain shamrock in the Transvaal for love or money. To insure my being able to wear the National emblem on St. Patrick's Day, therefore, she had worked that lovely spray for me with her own hand. I have always looked upon that as one of the most kindly, gracious and gratifying actions I have ever experienced and I preserved the emblem until it fell into dust from old age.

I am, &c.,

G. H. YOUNGE, F.R.C.S.I.

Lieut.-Col., R.A.M.C. (Ret.)

NON-VENEREAL SYPHILIS.

TO THE EDITOR OF "THE JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—Major L. B. Clarke's article on a case of extra-genital chancre calls to mind a few cases that I have met with in army practice.

(1) A man with a venereal sore of the gum—a revolting affair, as it was in the place from whence had been recently drawn a third lower molar. The pronounced secondary rash following a bubo under the jaw revealed the nature of the case. The victim had allowed a N.C.O. to draw a tooth for him. Having on one occasion seen the concave inner surface of a tooth forceps containing horrible sanguineous matter after the instrument had been cleaned on the outside and put away in the case, I can understand how the sore might arise when carelessness was displayed. Withal it may have been that the N.C.O. himself was the infecting agent.

(2) A sore the size of half-a-crown on the dorsum of the wrist.

(3) A sore on the eyebrow.

(4) A sore on the neck by the side of the larynx.

Cases 2, 3 and 4 made no claim to be pinnacles of virtue, so we may picture a mode of infection, though why not in the usual place is difficult to explain.

(5) A sore *in ano*, where the sufferer and a man who had secondaries had been shut up in prison together for some months.

(6) A sore on the lip of a girl on friendly terms with a man who had syphilis. No remarks.

Cases 2, 3 and 4 occurred in a warm, moist climate. May we suppose that in such a climate the organisms could exist longer on the damp skin than would be the case in a dry country? For none of these men had had a wound big enough to attract their attention. A warm, humid bed may be the explanation of the sores that one sees on the pubis, scrotum and on the dorsum or other exposed portions of the skin of the penis with no evidence of preliminary wound.

Syphilis *innocentium* is really important to individuals, for, if unrecognized, it may lead to grave injustice. And I imagine a good many cases are overlooked. The above are all I can fish up from my memory at the moment.

I remember reading years ago of a number of men being infected by a tattooist who, the dirty fellow, moistened his ink with spittle.

I am, etc.,
MARSHBURGH.

MOSQUITO-PROOFING OF BARRACKS OF BRITISH TROOPS IN INDIA.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—With reference to my letter of November 1, 1927, on "Mosquito-proofing of Barracks of British Troops in India," the following extracts from the Report on the Health of the Army for the year 1926 are of considerable interest:—

Page 90:—

"A still further decline in the incidence of malaria in Lahore has followed the mosquito-proofing in 1925 of the British infantry barracks and British Military Hospital. The comparison figures are as follows:—

1924	..	..	1,038·4 per 1,000
1925	..	..	706·2 per 1,000
1926	..	..	613·5 per 1,000"

And again, page 96:—

"*Mosquito-proofing of Barracks.*—This is an effective, *but expensive*, anti-malarial measure. In proportion as 'cold-storage' is effectively carried out, the necessity for mosquito-proofing barracks will be diminished."

The results of mosquito-proofing the British infantry barracks in

Lahore cantonments are shown by the following figures of admissions during the malarial season (August to October) of 1926 :—

Troops protected by mosquito-wire gauze			Troops not protected		
Average strength	Admissions	Ratio per 1,000	Average strength	Admissions	Ratio per 1,000
302	55	182.12	498	238	477.91

The apt expression "cold-storage" means the withdrawal of all British troops from malarial stations during the months of August, September and October, and sending them to Hill stations. The idea is admirable if carried out in the spirit of its intention, is a matter of high policy, and is in the hands of those who sit in the seats of the mighty.

From the outlook of the unenlightened one the proposition of "cold-storage" seems liable to be upset by:—

(1) Necessity to bring British troops down to the plains for various reasons that may arise.

(2) Possibilities of a mobilization concentration scheme arising and causing the return of all British troops to the plains.

(3) Cavalry and artillery will return to their plain stations in early October—necessary for training purposes.

(4) Extension of malarial season until end of November according to vagaries of temperature and humidity figures for the year (in Lahore cantonments we looked on November 15 as *about* the nearest figure for banking on the end of the malarial season).

(5) The month of July cannot be counted upon as malaria "free."

Now refer to "The Medical Department of the United States Army in the World War," as given in the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS for February of this year.

Pages 123 and 124 :—

"In cantonments the framed barracks were *screened*"—"Adequate screening was regarded as one of the most important features in the control of malaria." "It is estimated that the annual price which the United States pays as a result of 'paludism' is more than 100,000,000 dollars"—"800,000 men occupied camps where malaria was endemic." "In the Southern States 'paludism' costs annually 7 dollars per head" and "an expenditure of 5,600,000 dollars would have been justified." "The cost of the malarial campaign was 3,250,000 dollars and the results were considered excellent."

Thus the words from the Great Big Country where "expense" does not interfere with the far-sighted policy of spend now to save bigger expense.

What is the cost of "paludism" to the Indian Government for British troops alone? Include cost of hospital beds, drugs, medical and nursing staff, loss of training efficiency, invaliding, etc., for the 9,389 admissions for

malaria in India in 1926 (British troops) and get the Cost Accountants to make a bill of it. I expect it will be a considerable sum for a steady yearly expenditure.

I met an American lady in the north of India. She talked in the bright, brisk and efficient way American ladies do talk and concluded with the remark, "You Britishers in this country are way back behind the times. Why, in my country, we screen all our houses where malaria exists." I could only reply with the quotation:—

"And the end of the fight is a tombstone white
With the name of the late deceased.
The epitaph drear 'A fool lies here,
Who tried to hustle the East.'"

Colchester,
March 5, 1928.

I am, etc.,
N. J. C. RUTHERFORD, *Colonel.*

Notice.

CHADWICK PUBLIC LECTURES, 1928: SPRING PROGRAMME.

SUBJECTS of hygiene and sanitary science of special interest at the moment were discussed in the course of this Spring's programme of Chadwick Public Lectures, which began in London on Thursday, February 16, at 5.15 p.m., when Sir William Hamer gave his first lecture of two on "Epidemiology in England during the Last Hundred Years," in the Hastings Hall of the British Medical Association, Tavistock Square.

Sir William Collins, Chairman of the Chadwick Trustees, presided, and Sir William Hamer after stating general principles and irreducible facts, carried his story from the position a hundred years ago, through Hecker's Appeal and Chadwick's Sanitary Idea to the germ theory and considerations of specificity and evolution in disease.

On the following Thursday, February 23, at the same place and time, the chairman was Sir James Crichton-Browne and points of Sir William Hamer's discourse were Epidemiological Discipline, Creighton's History, the Great Influenzas of Recent Years, The Return to the Hippocratic Method, Sydenham's Constitutions and the Need for a Unity of Opposites.

On Friday, March 30, at 8.15 p.m., the "Bossom Gift Lecture" for the advancement of sanitary science in the direction of healthier and more economic building materials and constructional methods, was given in the Lecture Hall of the Royal Institute of British Architects, by Dr. R. E. Stradling, Director of Building Research in the Department of Scientific and Industrial Research.

Dr. Stradling chose the intriguing title of "Balbus Built a Wall."

The chairman was Mr. Alfred C. Bossom, F.R.I.B.A., founder of the Bossom Gift Trust.

"Sunlight, Natural and Manufactured, and its use in Modern Medicine," by Major Walter Elliott, M.P., M.B., D.Sc., Under-Secretary of the Board of Health, Agriculture and Education (Scotland), will be an evening lecture in May, date to be announced on Major Elliott's return from Nigeria. This will undoubtedly prove an attractive and informing discourse, not only for members of the medical profession, but for the general public for whom admission to Chadwick Lectures is always free.

The last fixture of the programme is Thursday, June 7, at 5 p.m., when Professor W. E. Dixon of the Pharmacological Laboratory, Cambridge, will be the lecturer at the Chelsea Physic Garden. Weather permitting this lecture will be given in the open air.

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Notices.

EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, etc. He will also be glad to receive items of news and information regarding matters of interest to the Corps from the various garrisons, districts, and commands at home and abroad.

All such Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps" will (unless the Author notified at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles.

A free issue of twenty-five reprints will be made to contributors of Original Communications, and of twenty-five excerpts of Lectures, Travels, Clinical and other Notes, and Echoes of the Past.

Any demand for *reprints, additional to the above*, or for excerpts must be forwarded at the time of submission of the article for publication.

Notices of Births, Marriages, and Deaths are inserted in the *Corps News and Gazette*, free of charge to subscribers. All communications should be written upon one side of the paper only; they should by preference be typewritten; but, if not, all proper names should be written in capital letters (or printed) to avoid mistakes, and be addressed: The Editor, "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS," War Office, Whitehall, S.W.1.

The Committee has sanctioned the publication of correspondence on matters of interest to the Corps, and of articles of a non-scientific character under a *nom-de-plume*. These communications must, however, be approved by the Editor before publication.

MANAGER'S NOTICES.

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Original Communications.

SOME MEDICAL REFERENCES IN PEPYS.¹

BY BREVET LIEUTENANT-COLONEL W. P. MACARTHUR.

Royal Army Medical Corps.

I SELECTED my subject this evening, after much thought, not because I pretend to any special knowledge of Pepys, but because the theme lends itself to a discursiveness in treatment, desirable, I thought, in addressing an audience so diverse in its interests and taste.

The six volumes of Pepys's Diary, containing over 3,000 closely written pages, commence at January 1, 1660, and cover the succeeding nine and a half years. The author—that curious mixture of man of affairs, virtuoso and busybody—has included in his picturesque narrative more than a little of medical interest, much less, of course, than he tells us of the Court and the Stage, for “sweet Barbara,” “pretty, witty Nell,” and the rest, had an interest for the susceptible Pepys far beyond that excited by any number of grave and reverend doctors of physic. And I think we cannot but commend his discrimination in taste.

The original manuscript, as everybody knows, is preserved in Magdalene College, Cambridge, and I think that anyone looking over the pages must wonder that it should lie undeciphered until the third decade of the nineteenth century; for although the narrative is written in shorthand, proper nouns are in ordinary script, and pages sprinkled with names like

¹ An address delivered at a Social Meeting of The Royal Society of Medicine and printed by kind permission.

Clarendon, Monke and Castlemaine, surely must include something well worth the study. The diary is written not in a private code of Pepys's own contriving, as so many people suppose, but in Thomas Shelton's system of shorthand, one of the several then in vogue. Shelton's system passed through two main stages, the first he called "Short writing," and the later version, that employed by Pepys, he dignified with the Greek name, "Tachygraphy." The first issue in the new model is said to have been entered at Stationers' Hall in 1638, but the earliest copy in the Library of the British Museum is dated 1641. I thought that a simple explanation of this system might interest some who have not studied the subject for themselves, so I prepared this lantern slide (figure 1) which shows a few lines from the first paragraph of the narrative, and have written in the translation. Very briefly letters, both vowels and consonants, are represented by set symbols, and there are also special symbols for common groups of letters, and for common words. Initial vowels are written, as in

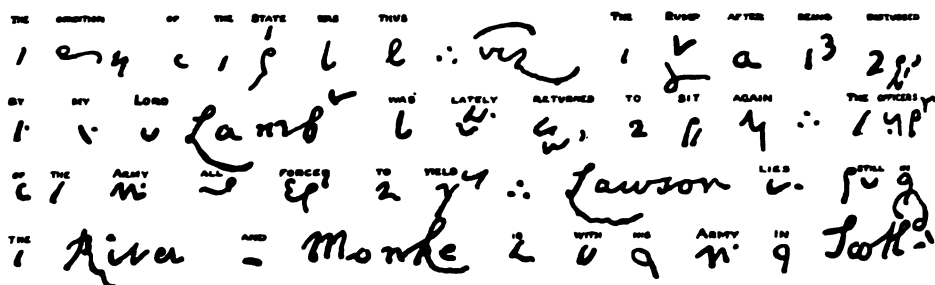


FIG. 1.—Four lines from the beginning of the Diary. (After reproduction, the translation was written in, and the whole re-photographed.)

the word "army," where the little angular sign represents "a"; but vowel signs are omitted from the body of words, the occurrence of a vowel being indicated by lifting the pen and leaving a space, the identity of the vowel being shown by the position of the next consonant. The vowel positions are grouped around consonants in the natural sequence, *a*, *e*, *i*, *o*, *u*. That of "*a*" is above the consonant, "*u*" at the opposite point below it,

and the remainder spaced out between, thus: $\begin{matrix} a \\ i \\ o \\ u \end{matrix}$. Take the sign for

"State," for example, the two symbols combined are *s* and *t* respectively; having written these, Pepys lifted his pen, thus showing that a vowel comes next, and then added another *t* immediately above the first consonant, i.e., in the "*a*" position. This made "Stat," i.e. "State." If he had placed the second "*t*" below the *st*, he would have formed the combination "stut." Terminal vowels, if pronounced, are indicated by a dot in the appropriate vowel position, as in "army" (*armi*).

In writing down the more intimate details of some of his adventures, Pepys employed a strange jargon of French, Latin, Portuguese and Greek,

and in addition sometimes inserted dumb letters so as to make the text still more difficult to decipher.

In the short time at my disposal it would be impossible to deal comprehensively with Pepys's medical references, for they range over a wide field—a successful experiment of blood transfusion in dogs, a result, he says, which may “be of mighty use to man's health, for the amending of bad blood by borrowing from a better body,” a prophecy fulfilled only in our own time; speculations regarding the causes of death in hanging, in connexion with the execution of one, Dillon, a member of an ancient Irish family, who by reason of his high descent enjoyed the privilege of being hanged with a silken rope instead of the hempen one allotted to the commonalty; reflections on his own operation for vesical calculus, when a stone “as large as a tennis ball,” says Evelyn, was removed, a pathological relic which the diarist used to carry about in his pocket, and display to his friends. If Samuel Pepys were alive to-day, he would sorely tax his ingenuity in stowing away on his person the like evidences of surgical aggression—his appendix in one pocket, his tonsils in another, a handful of teeth mixed up with his loose money, and, I suppose, his large intestine knotted round his waist.

So this evening I propose to touch on some of Pepys's records of epidemic diseases, not restricting myself to his account, but employing it as a text to be elaborated, and not as a sermon complete in itself.

Realizing the ravages of smallpox in that age we naturally look for some mention of the disease. “Never was such a time of small pox,” says Pepys, in recording outbreaks affecting various notabilities. But in this connection he has most to say of the tragic disfigurement of Frances Stewart, *La Belle Stewart*, the original of the figure of Britannia on our coinage. This lady, who combined the beauty of a goddess and the intelligence of a child of ten, was the daughter of a doctor of medicine, the Hon. Walter Stewart, son of that Earl of Blantyre who, as a child, shared with the youthful James VI of Scotland the ministrations of the learned and long-winded George Buchanan. Pepys joins in the universal testimony to her charms. Seeing her one day “with her hat cocked and a red plume, with her sweet eye, little Roman nose and excellent *taille*,” he thinks that kissing her would make him the happiest of men! There is no doubt that the lady attracted the errant fancy of the Merry Monarch, but I contend that Pepys's accusations, and the entertaining gossip of the “Grammont Memoirs,” do her the grossest injustice. Truly the ladies of King Charles's Court had Hamlet's plague for a dowry, for whatever their manner of life they could not escape calumny. Distracted by the plots centred around her, the poor lady declared her willingness to marry any one of her own station who would free her from the Court. Her kinsman, the Duke of Lennox and Richmond, fated to be the last of his race, came to the rescue, and one stormy evening the pair slipped off from Whitehall to the famous Bear Inn which stood at the Southwark end of London Bridge, the third

house on the left, where a coach was waiting which carried them off to Kent.

In this flight, declared Evelyn, she "hath done as great an act of honour as was ever done by woman." In the end Pepys withdraws his earlier charges, and writes: "It is the noblest romance and example of a brave lady that ever I read in my life." But the libels have had too long a start; Pepys's recantation, the testimony of John Evelyn, and of Bishop Burnet, are alike unheeded, and in the general conception Frances Stewart stands with Barbara Castlemaine, "Madame Cardwell" and the other harpies and termagants of the King's seraglio.

In March of 1668—the year after her marriage—Pepys learns that the poor lady is "mighty full of the small pox," which, he says sententiously, "is the greatest instance of the uncertainty of beauty that could be in this age"; but adds the practical reflection, "but then she hath had the benefit of it to be first married"!

One day, later in the year, he so far forgets the dignity of his office as to go into the King's garden and steal some apples off the trees, and there, walking with the Queen, he sees the Duchess of Richmond, noble of person as ever, but her beauty sorely ravaged by the cruel disease.

There was good reason for the horror and alarm aroused by smallpox in Stuart times. John Evelyn, after describing his own attack, records in a heart-broken outburst the death of his idolized daughter, Mary, "the joy of my life, the ornament of her sex, and of my poor family." Two months later her would-be husband, "Mr. Hussey," also fell a victim to smallpox. Within a few months, a second daughter, Elizabeth, met with the same fate just after her marriage. The next year Evelyn notes the death of Dolben, Archbishop of York, "a corpulent man," and "a learned, wise, stout and most worthy prelate." Lord Falkland, in whose house Mary Evelyn had contracted her fatal infection, later died himself of the same disease. So likewise did "my kinsman," John Evelyn, M.P., "a young and very hopeful gentleman"; and the following year Evelyn notes the death from smallpox of the only son of the Duke of Marlborough while at Cambridge. The fell malady took heavy toll of the reigning family. Soon after the Restoration, Charles II's brother, the Duke of Gloucester, succumbed to smallpox, and the disease carried off his sister, the Princess Royal, later in the year. Their brother, James II, more fortunate in his own person, recovered from a very severe attack, but lost his eldest son and his youngest daughter from the disease. His rival, William III, suffered grievously from the common scourge, for it robbed him first of both parents and then of his wife, Queen Mary, who died of hæmorrhagic smallpox in 1694. And it may have been smallpox which six years later carried off another royal Duke of Gloucester,¹ the heir-apparent, and thus cleared the Elector of Hanover's path to the English throne.

¹ For an account of the prince's illness, see *Brit. Med. Journ.*, 1928, I, 502.

I have searched in vain for records of a similar mortality in the Tudor period. Then smallpox was bracketed, and indeed confused, with measles, and seemingly esteemed a childish affection of no great moment. I think that the popular estimate of smallpox at that time is shown by a death-bed confession preserved in one of Stow's "Memoranda," and given to the world by Gairdner the historian. "Master Rychard Allington esquere" learning that his death from smallpox was imminent, summoned to his bedside the Master of the Rolls and four other lawyers on the "XXII of Novembre, 1561, abowte viii of ye clocke at nyght," and there made a death-bed confession of "abhominable userie." He commences in a spirit of pained surprise, obviously resentful that he should perish from so trifling an ailment: "Maisters, seinge that I muste nedes die, whiche I assure you I nevar thought wold have cum to passe by this disesease, consyderinge it is but ye smalle pockes"! Far different this from the disease that Evelyn in the next century describes as "very mortal." But the greater the change, the more things become the same, and to-day a mild variety of smallpox, suggesting to my mind that of the Tudor epoch, prevails extensively again. It is interesting to speculate if this, in its turn, will revert to its one-time malignancy.

Pepys's earliest notice of a prevailing epidemic is in the summer of 1661, when he states that "a sort of fever" caused widespread sickness in London and the country round about. Amongst those dead of the disorder he mentions Dean Fuller, author of the famous "Worthies of England," who caused Pepys such distress by excluding his family from the roll of the "Worthies," and this in spite of all the information thoughtfully furnished by the diarist. The Dean of St. Paul's is dead too, and "my Lord General Monke is very dangerously ill."

Pepys, quite rightly I believe, connects the epidemic with the unusually warm weather which had lasted right through the autumn and into the winter, so that in the following January Parliament appointed a Fast Day for intercession for more seasonable weather, for the summer had persisted until then, he says, "both as to warmth and every other thing just as if it were the middle of May or June, which do threaten a plague (as all men think) to follow." This extraordinary heat and the circumstances of the Fast Day are recorded also by John Evelyn, a strange reversal of our usual experience of "the English winter ending in July, to recommence in August."

What then was the nature of this strange and unaccustomed fever? Clearly it was not plague or typhus, smallpox or influenza, for with these Pepys and his fellows were but too familiar. From a consideration of Sydenham's account of epidemics at that time, I identify this strange fever as *malaria*, or, as he calls it, "intermittent fever," and it is only in the light of certain recent observations that we can appreciate the extraordinary accuracy of Sydenham's description of the disease. A study of untreated simple malaria, induced as a curative measure in general paralysis, has

shown that the great majority of these infections run a continued fever at first, and that the intermittent attacks, which were generally regarded as characteristic of malaria from the beginning, only commence later when the relapses occur. Bear this twentieth century observation in mind, and hear what Sydenham wrote nearly three hundred years ago. He says that these intermittent fevers "do not perfectly put on their shapes, for they imitate continued fevers so well that it is hard to distinguish them. But the violence of the constitution being a little quelled (*at retuso paulatim constitutionis impetu*), and its strength checked, having thrown off the mask (*larva abjecta*) they then openly appear to be intermittents, either tertians or quartans, as indeed they were really at first. And if this be not carefully observed, we shall be deceived in our prescriptions, much to the prejudice of our patients, while we mistake fevers of this kind, which are of the order of the intermittents, for true and genuine continued fevers."

This instance, and there are many such, is evidence of the leaven of truth in Chaucer's lines :—

"For out of oldē feldēs, as men seith,
Cometh al this newē corn from yeer to yeer ;
And out of oldē bokēs, in good feith,
Cometh al this newē science that men lere."

But the most extensive and illuminating of the medical entries are those concerned with the London Plague of 1665. The epidemic, of course, was bubonic plague, and I would remind non-medical members of the audience that this is primarily an ailment of the lower animals, chiefly rats, and that every outbreak of human bubonic plague is merely an accidental and non-essential offshoot of plague amongst animals; further, that the disease is carried from rat to rat, and from rat to man, by infected fleas. Bearing these points in mind, the prevalence of plague in those old times will cause no surprise. The chief residential quarter of London was the City, filthy and congested, its streets and lanes so narrow in parts that the occupants of opposite houses could lean out of their upper windows and shake hands across the roadway. In the liberties and out-parishes squalid slums had grown up, and their menace to the public health had long been manifest. In no less than three proclamations did Queen Elizabeth prohibit under severe penalties further building, one of the stated reasons for the injunction being the danger of plague. James I similarly thundered against the evil. The preamble of an Act of Oliver Cromwell's Government denounces overbuilding as "very mischievous and inconvenient, a great annoyance and nuisance to the Commonwealth, and a growing evil of late much multiplied and increased." The various nuisances that the citizens were specifically bidden to abate give us some idea of the horrors of the streets. An Act of the Common Council passed six years after the Plague, in a determined effort to cleanse the City, directs that dead dogs, dead cats, the inwards of beasts, bones of cattle, and the like, must not be thrown into the streets, nor may the gutters any longer be choked with carrion and stinking flesh. Swine are not to be fed in the streets, and

muckheaps are forbidden on private premises, "with more of horrible and awful which even to name"—if not unlawful, would be accounted most indelicate. Amongst all this filth, rats, kites and carrion crows held high festival. The rat was not the species common to-day, but the old English black house-rat; they did not burrow but nested in the lath-and-plaster houses, and when they died there of plague their vagrant fleas found ready harbourage on the human inhabitants.

People sometimes imagine that the plague of 1665 was something strange and unwonted, whereas it was merely the last of a long series which had flared up with wearying monotony for the preceding ten centuries. "One time with another," said Sir William Petty, "a plague happeneth in London every twenty years." Already in the seventeenth century there had been three great outbreaks of the disease—1603, 1625 and 1636—and of the sixty-odd years prior to the plague of 1665 there are only three years which are free from the records of plague deaths in London. For several months before the epidemic of 1665, plague had been smouldering in the out-parish of St. Giles-in-the-Fields, around Drury Lane and Long Acre, where in May and June it attained a pitch of virulence unequalled for forty years. By August the City was aflame. Pepys's first notices of the epidemic are in April and May when he mentions the great fear and apprehension in the City, and notes that two or three houses are already shut up, "God preserve us all!" One day in June—the hottest day ever felt in his life—much against his will he visited Drury Lane, where he saw several houses with the dread red cross on the doors, and "'Lord have mercy upon us,' writ up." So alarmed is he that he buys "some roll tobacco to smell and chaw, which took away the apprehension."

On June 10th the City was definitely invaded by plague, "and where should it begin," says Pepys, "but in my good friend and neighbour's Dr. Burnet in Fanchurch Street: which in both points troubles me mightily." Dr. Burnet, Pepys's ordinary medical attendant, was admitted M.D. of Cambridge in 1648, and elected an honorary Fellow of the College of Physicians in the December preceding the Plague.

The plague victim was the doctor's own servant, William Passon, and Burnet at first gained the applause of his neighbours, for when the nature of the infection became evident he shut up his house voluntarily without waiting for any official action, "which," says Pepys, "was very handsome."! But Burnet gained little by his public-spiritedness, for evilly-disposed persons seeing something sinister in this unusual haste, put about a rumour of foul play, and this was soon further embellished by the allegation that Dr. Burnet had been arrested and committed to Newgate on charge of murder. The libel gained such currency that on July 14th Burnet posted in the Royal Exchange a "Vindication," which was published also in the *Intelligencer* of July 18th, and in the *News* of July 20th.¹ It is printed

¹ Obviously printed from the same type, for the printer's error of italicizing "Upton" appears in both.

in Wheatley's *Pepysiana*—but with a number of textual errors. The Vindication was as follows: *Whereas some person or persons have maliciously forged and published that abominable falshood, viz. That I Alexander*

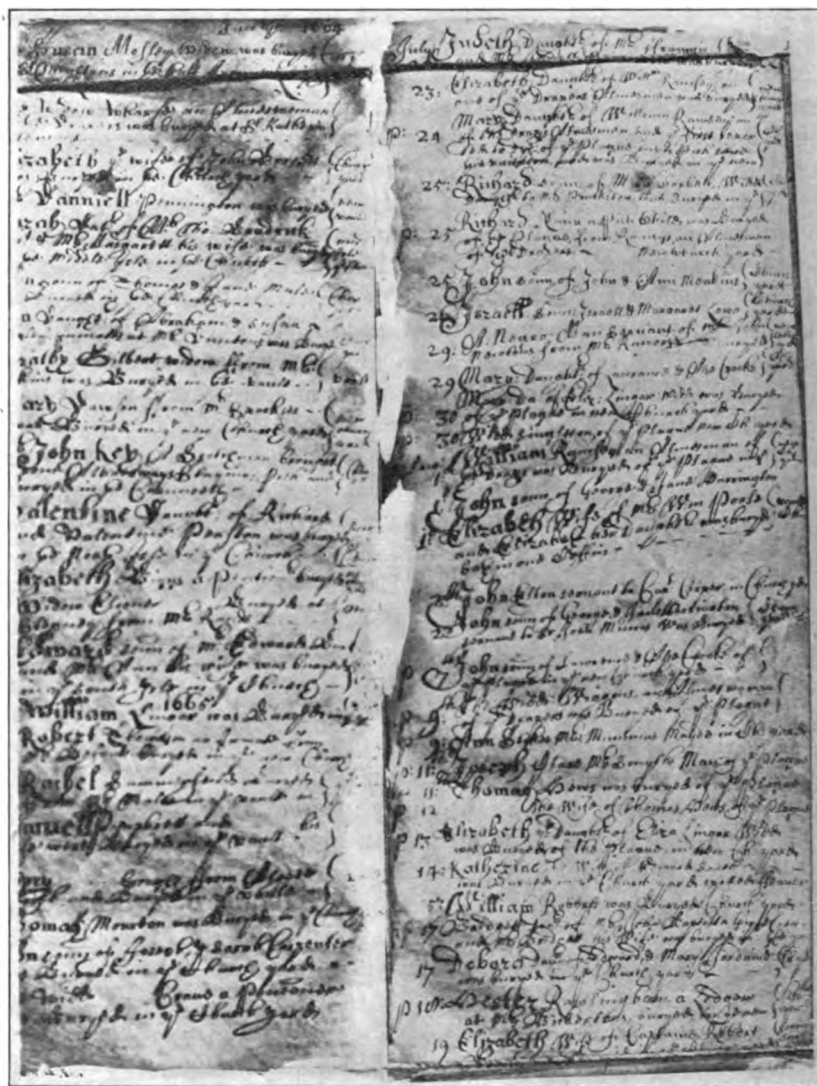


FIG. 2.—Burial Register, St. Olave's, Hart Street, first column, June 1664 to July, 1665; second column, July 22 to August 19, 1665. [Photographed by kind permission of the Church authorities.]

Burnet of St. Gabriel, Fen-Church, London, *Doctor in Physick*, did kill my Servant William Passon, and was committed to New-Gate for it; I do by these presents upon the Royal Exchange, London, post him or them for

Forgery, who have invented and vented that wicked Report: It being declared under the Hand and Seal of Mr. Nathaniel Upton, Master of the Pesthouse, London, who searched the Body of the said William Passon, that

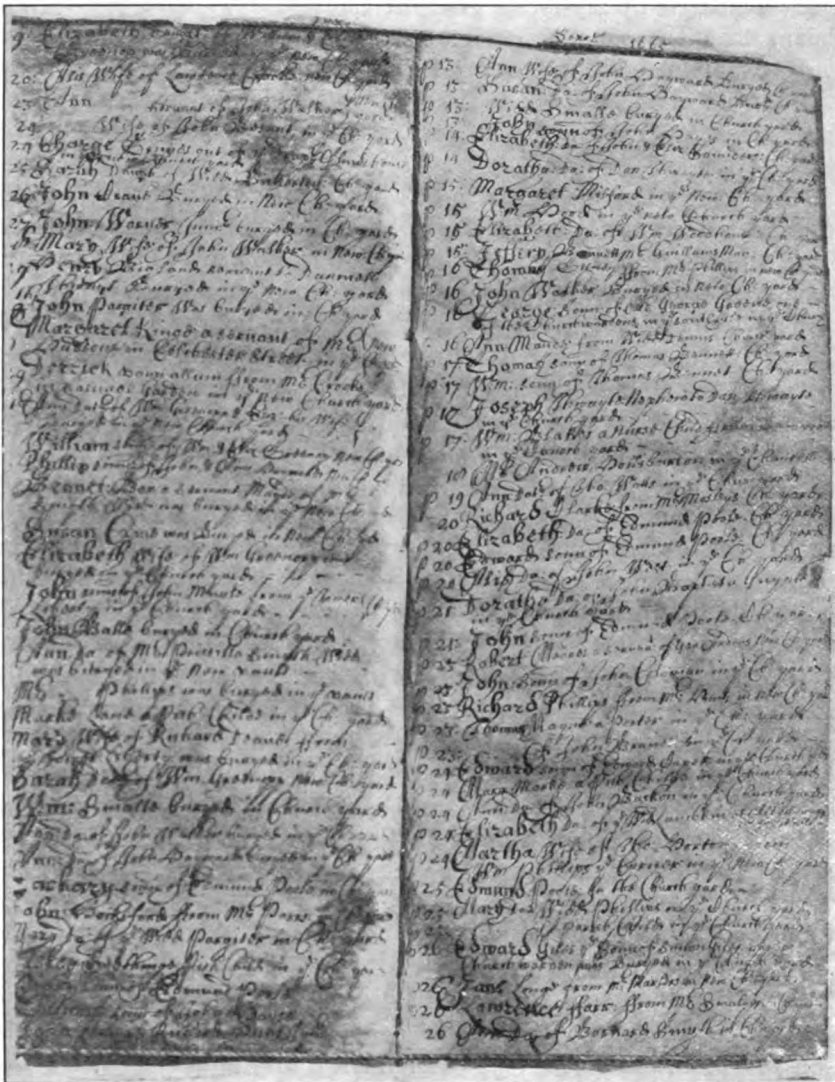


FIG. 3.—Burial Register, St. Olave's, Hart Street, August 19 to September 26, 1665.
(Photographed by kind permission of the Church authorities.)

he dyed of the Plague, and had a Pestilential Bubo in his Right Groin, and two Blanes in his Right Thigh.

July 14. 1665.

Alex. Burnet.

M.D.

But on the morning of August 25th Alexander Burnet heeded no longer the slanders of this malicious world, for in his house in Fenchurch Street he himself lay dead of the plague—"poor unfortunate man!" says Pepys. Dr. Burnet, Dr. Glover, M.D. of Aberdeen, Dr. O'Dowd licensed to practice medicine "by my lord's grace of Canterbury," with several other physicians and surgeons, as well as "one Johnson the chemist," died suddenly of plague within twenty-four hours. According to a rumour current at the time, they had all been infected whilst making a *post-mortem* examination of a plague corpse described as being "full of the tokens."

All this time "the plague is increasing mightily in the city," shut-up houses and red crosses abound everywhere, the church bells continually clanging, and most distressing of all to Pepys is the bell of his own church, St. Olave's, Hart Street, tolling and ringing so often; "a sad noise," he says. The same bell still hangs in the tower; I have rung it myself, and it seemed to me to give out a strangely mournful and depressing note.

I thought the audience might be interested to see reproductions of the burial entries of some of the poor creatures whose passing bell rang so dolorously in Pepys' ears, so by the kind permission of the Church authorities, I have prepared some photographs of their records (figs. 2 and 3). In fairness to the photographer of the Royal Army Medical College, I must point out that these pictures were taken under most difficult conditions, in the vestry of an ancient church, on a dark January day. I would first direct your attention to an entry of July 24th, the first marked with the ominous "P:" "Mary Daughter of William Ramsey on of the Draps: [Drapers'] Almesmen, and ye first reported to dye of ye Plague in this Pish [Parish] since this visitac'on, and was buried in ye new Ch. Y'd." I like the caution that prompted the insertion of "reported," for we notice that the girl's sister, Elizabeth, had been buried on the preceding day! We see, too, that Richard Nauy "was buried of ye Plague" from William Ramsey's house on the 25th, and William Ramsey himself on August 1st.

Poor little Richard Nauy, pathetically described as "a Pish [Parish] Child," was obviously farmed out with the Ramseys—I hope they were kind to the forlorn little fellow, who was one of three foundlings baptized on May 20th, 1658, and so would be aged about seven.

You will observe that of the four persons buried on August 1—there were only two burials during the whole month of August, 1664—only one, William Ramsey, is marked "P," evidence in support of Defoe's and Pepys' assertion regarding the understatement of plague deaths.¹

¹ The average numbers of burials in St. Olave's Church and graveyard in July, August, and September for the five years 1660-64 were 3.5, 3.9 and 6, respectively. In 1665 the numbers were: July 13 (4 "plague"), August 32 (20 "plague"), and September 72 (64 "plague"); these figures, of course, are exclusive of the enormous numbers buried in plague-pits and elsewhere.

The next slide shows the sad fate of the Poole family: September 10th "Zachary sonn of Edmund Poole"; September 11th "Henry sonn of Edmund Poole"; September 20th "Elizabeth Da: of Edmund Poole" and "Edward sonn of Edmund Poole"; September 21st "John sonn of Edmund Poole"; and lastly, on September 25th, poor Edmund Poole himself was delivered out of the miseries of this sinful world.

I had the curiosity to search for these children's names in the baptismal register, and find that the eldest, Henry, was baptized on May 10th, 1652, and Elizabeth, the youngest, on June 10th, 1664, and so were aged about thirteen and one year, respectively.

These pages also show that a Hayward family was wiped out in the same way, six of them being buried between September 2nd and September 13th.

While collecting material for my address this evening, I searched the registers of four churches for the entry of Dr. Burnet's burial, but without success. I was most hopeful in the case of his own parish church of St. Gabriel; although it was burned down in the Fire the following year, the registers were saved, but the records during the Plague obviously were very carelessly kept, and the absence of Dr. Burnet's name does not necessarily mean that he was buried elsewhere.

But the morning after writing the doleful note about the passing bell, Pepys cheers up, and is off betimes in his "new coloured silk suit, and coat trimmed with gold buttons, and gold broad lace round my hands, very rich and fine."

All this time he watches anxiously the mounting figures of the Bills of Mortality, and finding that his own parish clerk has falsified the weekly return by omitting one-third of the plague deaths, he is distressed to think that probably such trickery is rife all over London.

The Bills of Mortality, referred to so often in general literature, originally were concerned only with the plague deaths, but from 1592 they were issued weekly by the London Company of Parish Clerks, and gave the deaths from all causes; some of the diagnoses like "Plague" and "Smallpox" are clear and well defined; others like "Rising of the Lights," "Planet-struck" and "Griping in the Guts," leave something to be desired in the matter of exactness. The Bills of Mortality were based on the figures returned to the parish clerks by the searchers, "Ancient Matrons sworn to their Office," whose duty it was to view the bodies of all deceased and ascertain the cause of death.

The three following quotations illustrate the expenditure of parish funds entailed by the activities of the searchers and their co-workers.

"Paid the searchers for viewing the corpse of good-wife Phillips, who dyed of the plague . . . 0—0—6."

The dead woman's husband and children were then isolated in their dwelling for the statutory month, and the entry relative thereto runs:

"Laid out for good-man Phillips and his children, being shut up and visited . . . 0—5—0."

The third quotation explains itself:

"Laid out for Lylla Lewis in 3, Crane Court, being shut-upp of the plague, and laid out for her, and for the Nurse and burial . . . 0—18—0."



FIG. 4.—Scenes in London during the Plague of 1665. (From a contemporary print in the Pepysian Collection, reproduced by kind permission of the Master and Fellows of Magdalene College, Cambridge.)

The Plague Order of 1665 directs that the searchers are to be examined by physicians to determine their fitness for their posts.

During the same plague the College of Physicians issued instructions for the use of searchers, setting out the signs to be regarded as diagnostic

of plague, namely, Botches in the neck, armpit and groin, and the presence of Carbuncles, Tokens and Blains. "Botch" was the old name for the inflamed lymphatic glands now known as Buboes, whence "Bubonic" plague. "Carbuncle" was the name applied to gangrenous patches of skin; "Tokens" to hæmorrhagic spots in the skin; and "Blains" to blisters. It is very curious that of these four plague signs which from hundreds of independent accounts we know to have been common and usual lesions in plague in old times, only one—the botch or bubo—is universal in bubonic plague to-day, and many persons, familiar with the disease, have never seen carbuncles, tokens or blains.

Pepys accepted the official pronouncements regarding the nature of plague, and no doubt scoffed, like Defoe, at the minority who contended that the disease is due to some "animated Matter" which enters the body and throws off a poison there. Nathaniel Hodges investigated the subject, but the only evidence he found in support of this theory was an account of one plague patient "who in vomiting threw up a strange figured Insect, which appeared very fierce, and even assaulted such as were busie to observe it, whereupon it was crushed by a rude Hand, so that its shape is not very discernible" !

Although the Navy Office was moved to Greenwich about the beginning of September, Pepys was continually in and about London, but time does not permit any reference to his vivid notes. However, I should like to quote from a letter written to Lady Carteret at this time, as his correspondence is less well known than the diary. He says that he has resided in London until the plague deaths reached six thousand a week, till the streets were almost deserted, and little noise heard day or night but tolling of bells; till whole families had been swept away; "till the nights, though much lengthened, are grown too short to conceal the burials of those who died the day before . . . lastly, till I could find neither meat nor drink safe, the butchers being everywhere visited, my brewer's house shut up, and my baker with his whole family dead of the plague."

This copy of a print preserved by Pepys himself (fig. 4) shows some of the scenes in London during this awful time. The advent of immigrants from infected areas was always bitterly resented, often opposed by violence, and many towns, like Bath and Guildford, passed enactments excluding them. The uncompromising Scots went further, for a proclamation published in Edinburgh on July 15th, declared that such persons entering Scotland would be punished by confiscation of goods, and death without mercy.

In the fourth scene we notice that the bodies are not covered even with shrouds; perhaps these had been stolen by the dead-cart men, for the inhumanity and knavery of some of them knew no bounds. One, a brute, Buckinham by name, used to give imitations of a wood seller by standing in his cart, and holding up a dead child by the legs, while calling out, "Faggots, faggots, five for sixpence," till the Earl of Craven put an end

to these pleasantries by having him soundly flogged and committed to prison.

Pepys's household returned to London in December. He is much "frighted" at the sight of the graves piled so high in St. Olave's churchyard, and decides to avoid such dangerous neighbourhoods in future. None the less the following Sunday he attends church to hear his fugitive rector's excuse for his flight¹, "a very poor and short excuse," he says, "and a bad sermon." Snow had fallen in the night, and the graves in the churchyard were covered, and "so I was the less afraid."

Although plague had died down, the disease did not disappear from London for another fourteen years—deaths from plague being recorded annually until 1679—but there was no further epidemic. With the enforcement of the cleansing orders, a higher standard of general sanitation, and the diminishing number of dwelling-houses which served as sanctuaries for rats and fleas, the survival of plague became increasingly difficult, and when another epidemic had become due it failed to materialize.

The seventeenth century saw the end of plague in Britain; York suffered its final outbreak in 1604; Edinburgh in 1648; Dublin in 1650; Colchester in 1666, and Nottingham in 1667.

It is in keeping with the subject of my address to refer to the last and touching paragraph of the diary, for there Pepys explains that his failing eyes can no longer stand the strain of shorthand, and therefore he must sorrowfully bring his beloved journal to an end; "a course," he says, "which is almost as much as to see myself go into the grave: for which, and all the discomforts that will accompany my being blind, the good God prepare me."

If any of my audience have based their estimate of Pepys's character either on the more frivolous parts of his journal, or on representations on the stage, I would remind them that he was a conscientious and indefatigable worker, a most efficient public servant, and an honest one, according to the ideas of his age. If they are so unreasonable as to appraise some of his financial transactions by modern standards, I would further remind them that the Crown admittedly owed Pepys £28,000, not a penny of which ever was paid. The judgment of his contemporaries is shown by the honours they bestowed on him: President of the Royal Society, Master of Trinity House, Baron of the Cinque Ports, Member of Parliament; moreover, he was the esteemed friend and correspondent of men like Sir Isaac Newton, John Evelyn and Hans Sloane.

I like to think that the preservation of his eyesight may have been due,

¹ The Rev. Daniel Mills, D.D. He was the first in the parish to fly, deserting his charge like so many of the regular clergy whose behaviour in this respect contrasts very unfavourably with that of the Cromwellian ministers. See the Rev. Thos. Vincent's denunciation of his fugitive brethren in *God's Terrible Voice*.

in some measure, to the counsel of his doctor friends, for he held the science of medicine in a high regard, unmerited, I fear, in those days of its infancy ; a regard indeed far from universal in old times. Those of you who have read the "Paston Letters" may recall a distressing exhibition of distrust in medical science—and medical science at its highest and best!—recorded there. It occurs in the penultimate paragraph of a letter written from Norfolk by Margaret Paston, to her "ryght worshypful hosbond, John Paston," "on the Fryday next before Sceynt Bernabye," 1464. Alarmed at the thought of her husband alone in London, she first warns him against the knavish tricks of his political enemies. But then, bethinking her of the most imminent peril that besets his path, she breaks out into this impassioned appeal: "For Goddys sake be war what medesyngs ye take of any fysiassians of London ; I schal never trust to hem be cause of your fadr and mine onkyl, whoys sowlys God assoyle" !

EXPERIENCES OF AN E.M.O.

By I. A. F.

To make sound deductions from experience, reflection and comparison are necessary.—
(F.S.R., I, 3 (3)).

As my experience as an Embarkation Medical Officer is now more than a decade old, there has been ample time and opportunity for reflection and comparison.

The deduction arrived at is a confirmation of the old saying that many a truth is spoken in jest ; witness "Don Quixote," "Hajji Baba," W.W. Jacob's bargees and a host of others.

If, in perusing these pages, the reader is inclined to doubt my veracity—or sobriety—let him remember the "Experiences of an Irish R.M."

Some war-time E.M.O.'s resembled certain Irish R.M.'s, inasmuch as their lots were not cast according to the little red book.

I was one of them.

Some day I shall write a tragedy entitled "Toujours en retard." It will show the *official* method of dealing with ambulance trains which arrived late.

(Note.—Ambulance trains never arrived anything else but late.)

Then I shall write a comedy entitled "On se sauve." This will show the *unofficial* method of dealing with the matter.

Pending the publication of these plays it may be of interest—and perhaps of use—to the readers of the Journal to know something of the origin and substance of the proposed pieces.

TOUJOURS EN RETARD.

The time is midwinter, the period 1914-18 and the place the Gare Maritime.

The curtain will rise at the break of dawn ; a cold, stormy dawn. The wind howls, the sea roars and squalls of rain and sleet sweep across the deserted quay.

Considerable stagecraft will be needed to make the scene appear sufficiently moist and miserable.

Enter the E.M.O.

He shivers.

The fact is that the call boy was late with the cue and the wretched E.M.O. had only time to pull on his uniform over his pyjamas. However, the audience won't know this because it is too cold for him to undress.

For half an hour the E.M.O. paces the quay. As a distinguished officer has said : "If you want to keep the home fires burning you must stand a long way off from the hearthrug."

Dawn merges into day ; it is less dark, but more dismal.

Captain Pieter Gheluveld of the Belgian Navy appears on the bridge of H.M. Hospital Ship "Tipperary."

P. G. [shouting through a megaphone] : At what hour is it that the sanitary train will arrive ?

E.M.O. [reading from a telegram] : (inaudible).

P. G. [bellowing through megaphone] : *Comment ?*

E.M.O. makes the hand signal for "Cease Fire," hitches up his pyjamas and continues to pace the quay.

He shivers.

Exit Captain Pieter Gheluveld of the Belgian Navy.

Another half hour passes while the depression from Iceland continues its malevolent activities.

Enter Captain Shamus O'Manus, R.A.M.C. (S.R.) on the promenade (and *not* on the hurricane) deck. He places his hands funnel-wise in front of his mouth—like an Indian smoking a cigarette—and in a loud voice makes inquiries about the arrival of the train.

E.M.O. [reading from a telegram] : (inaudible).

S. O'M. : Phwat ? Spake up will ye !

E.M.O. makes the manual sign for "Nothing doing" and resumes his beat on the sad, slippery quay.

He sits on a wooden bollard in order surreptitiously to tighten his pyjama halliards.

He shivers ; indeed, he goes on shivering the whole time.

Enter Commander Horatio Backstay, Kaisar-i-Hind and R.N.R., on loan from the Hooghli Pilot Service. He is the D.N.T.O.—an important personage who possesses a number of corns which are quite easy to tread on.

H. B. : When is your ambulance train due to make port ?

(*Note.*—The effect of the tragedy will depend upon the way in which actors enunciate the word "your," viz., with emphasis, and a certain amount of irritation and reproach.)

E.M.O. [reading from telegram] . . . (chatter) . . . (chatter) . . .

H. B. : Let me see [reads] "No. XXX Ambulance Train will arrive at 07.00 hours." But, my poor fellow, it is now half past eight. However, it's your funeral, and the ship will leave at 11.30 a.m. whether your train arrives or not.

Enter Major Angus Macrihanish, R.P. 1889. He wears tartan trews and carries a seven-foot alpenstock. He is the E.S.O.—a person of weight who should be conciliated.

The Mac. : And when will your train be arriving ?

E.M.O. : Sir, you are aware that I am not allowed direct access to the French railway authorities. You are the official channel of communication. Will you please take the necessary action ?

Exit Commander Backstay and The Macrihanish.

The E.M.O. continues sentry-go while the stage gradually fills with stretcher-bearers and motor ambulances.

The bearers will be German prisoners of war, Fijians, or Labour Battalion (C 3) men, whichever happen to be available when the play is produced.

The ambulances are driven by women.

The bearers are morose and the drivers are merry and bright, but everybody shivers.

The wind shrieks and the driven rain sweeps horizontally across the quay.

Enter the Guv'nor. She is tall and graceful. Her tresses—pre-shingle period—are blown in wet wisps over her mouth, nose, ears and eyes. She is O.C., M.A.C. Her conversation reveals tact and intuition.

The G. [acidly-sweet]: When was your train due?

E.M.O.: At seven o'clock.

The G.: H'm. It is now nine. When do you expect your train will arrive?

E.M.O.; Between half-past ten and eleven—perhaps.

The G.: Then you have time to cut along to the Mess, put on more clothes and swallow some hot coffee. Margaret!

The E.M.O. is bundled into Margaret's car.

However, Margaret's car refuses to start up; it shivers, chatters, splutters and gives up any idea of functioning.

The Guv'nor says a few kind words to Margaret, when—

Enter *Monsieur le Capitaine Raoul Riant, Chasseur Alpin, Légion d'Honneur, beau sabreur, débonnaire*, etc. As it is not possible adequately to translate these terms, his appearance is better imagined than described. He is the railway liaison officer.

So far the principal characters have been of relative, and not of absolute, importance. They are necessary to the movement of the play, but not to the movement of the train.

The advent of Le Capitaine R. Riant introduces a factor of absolute importance which does affect the movement of the train.

At least, so I thought. Now I am doubtful. The discussion of my future comedy, "On se sauve," will explain why. Meanwhile . . .

Raoul [doffing his béret]: *Bon jour, mademoiselle; bon jour, mon majeur*. How do you carry yourselves?

E.M.O.: Attention, my *capitaine*! Have you seen Messieurs Backstay and Macrihanish? They are transported with anger and seek to murder you.

Raoul: *Parbleu*—No! and why?

E.M.O.: Because this cursed train is so late.

Raoul: What train?

E.M.O.: Ambulance Train No. XXX.

Raoul: Ah—yes—to be sure. Your train—I had forgotten. No matter. I go to the encounter of the good Messieurs Backstay and Macrihanish.

Exit Le Capitaine Raoul Riant.

The storm rages with increased fury. Everyone is wet to the skin and chilled to the marrow.

Enter Commander Backstay, Major Macrihanish and Le Capitaine Riant.

Raoul [cheerfully]: Your sanitary train is now at Bricquettes, thirty kilometres distant. It will arrive here at eleven hours.

The Mac. [gloomily]: Will that give you time to load?

E.M.O. [bowler hat expression]: No.

H. B. [obstinately]: The ship sails at eleven thirty and not a minute later even if . . .

The Commander's further remarks are drowned by a loud whistling (off) and the arrival of Ambulance Train No. XXX.

Tremendous activity prevails everywhere.

Captain Pieter Gheluveld reappears on the bridge of the "Tipperary," waggles the handles attached to every brass dial within reach and tests the steam syren several times.

Captain Shamus O'Manus stands at the foot of the gangway and pins artistically coloured rosettes on the chests of the lying patients.

Commander Horatio Backstay marches up and down the quay with a stop watch in his hand, and gets in the way of the bearer squads.

Major Angus Macrihanish herds the "walkers" on to the ship by a skilful use of his alpenstock. You see him counting the sheep just as it is done in Cromarty at the dipping season.

The stretcher-bearers perspire and curse Commander Backstay who, however, knows nothing of lip reading.

The ambulances pull out at 2½ m.p.h. *en route* to the hospital with patients unfit for the Channel crossing.

The Guv'nor misses the last ambulance and has to walk back to convoy headquarters.

Le Capitaine Riant wonders what he will have for *déjeuner*; he is the busiest of all.

The E.M.O. gives a final hitch to his pyjamas, makes a rapid calculation, reckons that the last patient will be embarked by 11.15 a.m., and is content.

Something accomplished, something done. After all it is not such a bad old world.

Enter Captain John Smith, R.A.M.C. (T.C.) O.C. No. XXX. A.T.

E.M.O.: Well done, John. You had a fast run from Bricquettes, eh?

J. S.: Bricquettes be blowed! We've been lying in a siding only a mile from here since six o'clock this morning. Can't you do . . .

He is interrupted by the sudden and precipitate entry of Lance-Corporal Poullice, the E.M.O.'s aide.

P. [breathlessly]: Please sir—two ambulance barges have arrived at the Bassin des Blessés and the orders are that they are to be unloaded by twelve noon—s'elp me sir.

CURTAIN.

I devoted much time to the problem. Clearly, it could not remain for ever unsolved ; and yet, that was the prospect, unless I could obtain direct access to the executive French authority responsible.

But how ?

I paid a private visit to my friend Monsieur Alphonse Chablis, lessee of the "A la Belle Sauvage."

Monsieur le Capitaine R. Riant accepted my genteel invitation with the greatest pleasure. He arrived at the Belle Sauvage in full war paint, béret, aiguillettes, decorations, medals and all.

He was radiant.

He was wearing a new aluminium artificial limb for the first time. As he advanced to greet me he slapped the metal contraption sharply with his cane—clang ! like an empty kerosene tin. I jumped, and so did every one else. Then he pulled up his baggy trouser leg high above the knee, revealing a delicate pink skin sown discreetly with black hair.

The whole restaurant was entranced.

There followed a practical demonstration of the acrobatic capabilities of the cunningly contrived joints.

The restaurant went into ecstasies.

Le Capitaine sat down heated, but happy, amidst great applause.

"Bravo !" "Éclatant !" "Épatant !"

"Poor fools" whispered he, "they do not know it is a much better leg than the one which the Boches removed for me on the Marne."

Thanks to the excellent Alphonse the dinner was a great success ; and thanks to Riant's advice and help the situation was saved.

"Remember this, my dear *majeur* ; it is of interest to us to know that your train, sanitary, English, is in the north, south, east or west ; that it is empty, or full of wounded ; that it is conducted by a goods, or an Atlantic, engine.

"But it is of no interest to us to know that the said train is at Bricquettes, or nearer. In other words, my brave one, we deal in strategy. For tactical operations go elsewhere, and I have already told you where."

Out of this piece of information arises the skeleton of my proposed comedy, "Pas Toujours en Retard," or :—

ON SE SAUVE.

Time, Midwinter. Period, 1914-18.

Act I.—The Gare Maritime.

The curtain rises at 8 a.m. Snow to a depth of three inches is turning into slush.

Enter the E.M.O., fully and properly dressed.

E.M.O. [reading from telegrams]: A.T. No. XXX will arrive at Gare Maritime at 07.00 hours for loading H.S. "Tipperary." Amb. Barges, X, X, XII, will arrive Bassin des Blessés at 12.00 hrs. for off-loading to

Madras General Hospital. A.T., No. XXXI, will arrive Gare Centrale at 13.00 hours for off-loading to St. John's Hospital.

E.M.O. clambers over a coal stack, peers through the window of a lamp-room, and finally runs down his quarry in a ganger's hut.

The quarry is Monsieur Edouard Pamplemousse, *Sous-Chef Principal des Gares*.

He is engaged in his Quarterly Check of Station Stores.

He is a tall, heavily-built, dark man, with a deep, husky voice.

E.M.O. : Hi : Good day, Monsieur Pamplemousse.

E. P. : Hola ! Good-day, my *majeur*.

E.M.O. : Where is A.T. sanitary, English, No. XXX ?

E. P. [at telephone] : 'Ello ! Pierre, 'Ello ! Pierrot, 'ello ! 'ello ! 'ELLO ! Pierrrrre, good ! Where is A.T. sanitary, English, No. XXX. At the coal dump ? Then—

E.M.O. [interrupting] : Splendid ! It will be in within five minutes.

E. P. [at telephone] : Pierre, 'ello ! Retard the train for thirty minutes Finish !

E.M.O. : My good Pamplemousse, how could you ? It is not just, it is cruel, it is—

E. P. : Is it not that I, Edouard Pamplemousse, am *sous-chef principal* here ? Yes, it is, monsieur. Then will I save you from your own folly impatient and efficiency imbecile. Be pleased to accompany me, monsieur ; one still has thirty minutes of leisure.

Exit E.M.O. and Pamplemousse, as curtain falls.

Act II.—The Sitting-room at Monsieur Pamplemousse's Quarters, Gare Maritime.

E.M.O. and Pamplemousse are seated at a table.

Enter Madame Pamplemousse carrying a tray.

Mde. P. : You love the good *café-au-lait*, is it not so, monsieur ?

E.M.O. : But yes, enormously ; and especially yours.

Mde. P. : Ah ! monsieur . . .

E. P. : Again more sugar, my darling.

Mde. P. : And as I was telling you, monsieur, my daughter Lucille who is married to the son of the *adjoint-chef principal des gares*—

E.M.O. : Your husband's superior ?

Mde. P. : Precisely, monsieur ; there is now no doubt that she will have a baby next June, because she tells me that—

E.M.O. [hurriedly] : But this is excellent coffee ; it warms the heart. And what of your boy Jean ?

E. P. : Ah ! Jean ? To-day I make the visit to my *chef principal* in order to open negotiations for the marriage of his daughter with my son Jean. But it will be difficult, my *majeur*, for Jean already has a little friend—

Mde. P. [proudly]: Jean is the image of his father, monsieur, very affectionate. I remember—

E. P.: No matter; to resume—Jean's little friend is completely enamoured of him, and I fear it may cost us dear. What do you advise, my *majeur*?

A loud whistling (off) drowns the E.M.O.'s answer.

E. P. [triumphantly]: There, my *majeur*, eight thirty and the train arrives.

Curtain falls as E.M.O. shakes hands all round and makes for the door.

Act III.—The Gare Centrale on the following day. Monsieur Ed. Pamplemousse is discovered at the telephone.

Enter the E.M.O.

E. P.: 'Ello, Bricquettes! but it is now seven thirty hours. Send on the train, sanitary, english, immediately. What? It matters not at all. Hurry you. If the train is not arrived here by eight fifteen, I against you will make a report. Finish!

E.M.O.: I thank you, mon ami; and now there are to us forty minutes of leisure; let us rest awhile.

Exit together. Curtain.

Act IV.—Interior of the Café Séville, opposite the Gare Centrale.

E.M.O. and Pamplemousse are sitting at a small marble-topped table, drinking large quantities of *café-au-lait*. Madame the proprietress stands by.

E. P.: Yes, I thank you, my *majeur*; it is an operation difficult and delicate, an advanced operation to contract close family relationships with one's superiors. I am content with my visit! the *chef principal* regards my Jean with favour. It is good. I hope that within a year Jean will lead the little lady to the altar of Our Lady Maritime and—

E.M.O. [scandalized]: The altar! But, my poor Pamplemousse, you are an atheist!

E.P. [indignant]: But yes, of course I am. Only—would you have my children christened, married, or buried in any other way than by the good offices of Mother Church? Go to! Is it that I am a barbarian!

E.M.O. [sadly]: I do not understand.

E. P. [scornfully]: You English—how can you? Nevertheless I explain, thus: I join the railway administration. I become a Republican Socialist; it is advisable. I become a Freemason; it is necessary. I become anti-clerical; it is essential. I become the father of a family; it is of importance. I become a potential grandfather with the *adjoint chef* on one hand and the *chef* on the other; it is primarily premeditated and

secondarily involuntary. I become marked for promotion; it is logical. But—

Madame: You become a church-goer; it is natural. Were you not at the watch night service last New Year?

E. P. [furious]: I went. Admitted. But in these days of Boche *avions*, was not the church plunged in utter darkness, madame? If I could not see the good Abbé, how could he see me? Answer me that, madame!

E.M.O.: More sugar?

E. P.: I thank you.

CURTAIN.

Envoi.

They sent me up to the front again. It was late at night when I boarded the train; also it was pitch dark, for the maroons had sounded and several heavy explosions had already shaken the air. Anti-aircraft guns were making a great noise, and every now and again a rocket soared and burst in bright flame. In the light of the latter Monsieur Edouard Pamplemousse was silhouetted against the murky night.

His dress included a long, double-breasted frock coat, a white evening bow tie and a glossy stove-pipe hat.

I was touched.

As the train moved out he said, "Your compartment is a special, reserved, first-class and altogether clean."

A terrific explosion cut short our adieus; but I hope he heard my final "*Bonne chance, mon camarade!*"

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THE MILITARY CHILDREN'S WELFARE CENTRE.

By MILDRED LISTER.

EVERY children's welfare centre is an Imperial asset. In many minds, however, there still lingers the belief that this work, while of unquestionable value in congested slum areas, is altogether superfluous when applied to healthy subjects living under more satisfactory conditions. With regard to the military welfare centre in particular, how often do we hear the argument: This is such a healthy place, and soldiers' children are so strong; there is no need for a welfare centre here. In other words: Let us do nothing for those who, by reason of their sound heredity and favourable environment, present the finest raw material for successful race culture.

By all means let the nation bring knowledge and common sense within the reach of all its citizens. There is no one, however unenviable his lot, who cannot, by his own effort, improve certain aspects of his condition; while public assistance, if wisely administered, is a national investment and not an extravagance. At the same time we are faced with the undeniable fact that the scientific and social work carried on in connexion with the childhood of to-day, while raising many a potential C 3 citizen to be a Class II Briton of the future, does undoubtedly increase, to a considerable degree, the proportion of degenerate survivals.

It is therefore of the utmost importance that the flower of British working-class babyhood, the Class A 1 baby, should enter into his rights, and receive from an enlightened and sympathetically counselled motherhood the fullest opportunities for sound and vigorous development.

I do not claim for the soldiers' babies that they are in any way unique in the possession of those latent qualities which make for useful citizenship; but where, if anywhere in this country, can we find such a conveniently organized group of "desirables"?

Their fathers on enlistment have passed a test of physical fitness, their mothers are not harassed by fear of failure of the weekly wage, their homes (if their parents are living in quarters) are subjected to strict hygienic supervision, and adequate medical attention is provided. It is just because they already possess so much and require so little, that the giving of that little is so tremendously worth while. But now I must face a real difficulty in writing an account of my experiences of child welfare work for the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS. Until a request reached me, asking me to do so, I had never seen a copy of that Journal. Who, then, will be my reader? Probably not the one person to whom I feel fitted to write—the woman who, like myself, has found herself in charge of a military welfare centre without any previous knowledge of this particular work. My acquaintance with infant welfare work is only of two years'

date ; my previous experience of public work amongst children having been in connexion with the abnormal child—physically, mentally and morally—of school age, in institutions under the London County Council.

However, as the military welfare centre depends for its success upon the co-operation of the R.A.M.C. with the women organizers of these centres, and upon their mutual belief in one another, perhaps a description of this work, viewed from a different—a lay—angle may be of some slight value.

The centre of which I have been asked to give a description has, in a brief existence of seven months, attained a certain measure of success ; and this is largely attributable to the co-operation of the R.A.M.C. and of my helpers, combined with the enthusiasm of the mothers themselves. To the mothers indeed we owe our most spectacular success ; for we are the only military welfare centre to have entered candidates for the Mothercraft Examination of the Association of Infant Welfare and Maternity Centres. Owing to the shortness of the time available for coaching and preparation only six candidates were entered, but they were all successful, and the quality of their work won for us a letter of praise from the Hon. Secretary of the A.I.W.M.C. in which she wrote : “ Our examiner told me that she has never had better papers in the non-competitive examination than those sent in by your mothers.” We were also honoured by receiving a letter of congratulation from Lady Worthington-Evans, wife of the Secretary of State for War.

ORGANIZATION OF A WELFARE CENTRE.

The Chairman.—Undoubtedly, the first difficulty of welfare centre organization in the Army is the military doctrine of predestination. If a military welfare centre catechism existed, I think it would begin somewhat as follows :—

Question 1 : Why are welfare centres needed ?

Answer : Because an instinctive knowledge of mothercraft does not come to a woman automatically upon the birth of her child.

Question 2 : When does this knowledge come to her ?

Answer : On the day when her husband is promoted Lieutenant-Colonel.

The Lieutenant-Colonel's wife, by reason of the years spent by her husband in acquiring knowledge of military affairs, frequently finds herself, without preparation or experience, at the head of an existing welfare centre, or under the obligation to open one. Personally I never mind who leads me so long as I am well led, and I could work loyally and happily under the guidance of the junior captain's or subaltern's bride, provided that she knew her job. At the same time nothing is ever gained by disregarding deep-rooted prejudices, and so long as the senior officer's wife has no illusions as to her own infallibility, it may be all to the good if others will bestow a certain measure of ready-made confidence upon her.

Having recognized her lack of experience (and it is for the inexperienced alone that I write) the novice chairman must take steps to acquaint herself with the work of other centres, and so acquire a clear idea of the standard which can be attained. I began my inquiries by visiting the chairman of a neighbouring centre. The questions to which I hoped to receive answers were the following: Where do you obtain instructional leaflets on welfare organization? What are the infant foods in greatest demand, and how do you import these? (We were overseas.) What educational work do you undertake with regard to the mothers? The answer to all these questions was briefly "We don't," and the following explanation was added: "Our centre is just like a family party; if you try to teach the mothers anything they will be offended; my mothers simply love me." Of course it is very nice to be loved, but the opportunities afforded by the welfare centre as a personal popularity agency had not occurred to me. Certainly there must be love—the love of young mothers directed into practical channels for the good of their children, through the loving sympathy and willing service of those in a position to help them.

I returned home and wrote a letter to the secretary of one of the biggest London municipal centres, the one which had that year been awarded the Mothercraft Shield, and I asked her to give me an account of all the activities undertaken by her centre. She replied giving me much practical information, and above all, putting me into touch with the Association of Infant Welfare and Maternity Centres, 117, Piccadilly, London, W. 1. My advice to the inexperienced chairman is to write, or better still, to pay a personal visit to this organization. I, myself, can never be sufficiently grateful to Miss Halford, the Hon. Secretary, for all the help and advice she has given me. In the absence of any leaflet dealing with the organization of military welfare centres, the novice chairman cannot do better than obtain from the A.I.W.M.C. a copy of their leaflet "How to start a Welfare Centre in a Rural District." She will also be informed of the qualifications required of a welfare centre wishing to apply for affiliation to the A.I.W.M.C. and she should endeavour to obtain affiliation for her centre at the earliest possible moment. Arrangements can also be made for her to pay personal visits to some of the large municipal welfare centres and day nurseries, where she will see this work being carried on under the most up to date conditions.

The Building.—When she has formed a plan as to the general lines on which she intends to run her centre, the selection of a building must be made. The accommodation should consist of a large room or hall suitable for the general work of the centre, including consultations, lectures, teas, etc.; a smaller room adjoining, to serve as a toddlers' playroom; a pantry with sink and gas ring; a lavatory; a covered place for perambulators; also adequate lock-up cupboard accommodation for storing the welfare equipment. In the case of large centres where lectures form an important part of the work, a nursery with cots for infants, out of sound range of the hall, is of inestimable comfort to the speakers.

The Helpers.—The chairman is next confronted with the problem of enlisting helpers. If, as in the case of my overseas centre, she is in charge of the welfare work of a large district, her task is comparatively easy. She will ask each regiment or unit to appoint one representative, and in almost every case someone genuinely interested in the work will be found. If, however, she has come to the station as a stranger, and is under the obligation of selecting most of her helpers personally, a useful plan is to ask several people to suggest various names, giving their reasons. Thus she will be told: Mrs. White and Mrs. Grey ought to help, they never do anything, but Mrs. Black and Mrs. Green are always so busy. Here at least is a valuable clue, and she will invite the assistance of busy Mrs. Black and energetic Mrs. Green. Mrs. White and Mrs. Grey are probably 25 years of age or more, and if they have succeeded in reaching that age without finding anything to do, the value of their help is open to doubt. Little Mrs. or Miss Brown, fresh from school, is a new and untried proposition. If she brings with her a good head and a willing pair of little hands she will prove an extremely valuable assistant, while the mothers, some of whom are little more than children themselves, greatly appreciate the presence of one or two very young helpers. The next step is to call a meeting of the helpers and let each, as far as possible, select the branch of work she prefers. Up to this point everything is sure to have gone smoothly for the chairman, but Heaven will indeed have showered its mercies upon her if, as time goes on, nobody ever takes offence. But if trouble occurs, she should contrive to shoulder the blame personally for any supposed slight, in order that peace may be quickly restored, as she presumably is made of some sort of non-inflammable material. If, however, the disease does not yield to treatment in spite of all her efforts, she may assume with tolerable certainty that there has been previous history of the complaint, and that the distressing attack of which she has been the unwitting cause is not a malady which the sufferer has contracted like measles, but rather an aggravated chronic condition. At the same time she must not forget that most of us have the vices of our virtues, and that she who is hard on others often sets a very high standard for herself. She may easily be one of the best helpers and just the one to be relied upon in an emergency. However, there is another kind of helper, the perfect helper. I have been told that she does not exist, but this is not true. I have known her and worked with her many a time. Here is her portrait:—

THE PERFECT WELFARE CENTRE HELPER.

(With apologies to her cousin, the perfect guest.)

She always sent a line to say
When she was forced to be away,
And made arrangements with a neighbour
To undertake her sphere of labour.
She never said she couldn't bear
To miss her golf in weather fair,

Nor feared a chill when blizzards blew
 Though mothers came and babies too.
 The morning of each welfare date
 She always came and pulled her weight ;
 Her playroom, food or clothing store,
 She set it out, nor left it for
 Some other helper to arrange.
 She always brought sufficient change,
 And never said she couldn't stay
 To help to put the things away.
 When others failed she didn't grumble
 But helped with door lists, teas or jumble,
 Or tiny mites in cots she tended.
 She never seemed to get offended.
 Her fountain pen did not run dry.
 And when the mothers came to buy
 Foods, books or woollies, soft and light,
 Her cash account was always right.
 She never seemed to fuss or strain
 Because she always used her brain,
 And never failed to do her part
 Because she had a mother's heart.

Circularizing the Mothers.—As soon as the date of the opening meeting has been fixed, a circular, describing the aims and advantages of the centre should be drawn up, and distributed (by personal visit if possible) to all mothers with children under school age, coming within the area of the centre. Certain equipment, notably the weighing machine, must be procured before the opening meeting ; but perhaps a description of a visit to my centre on a welfare day will give the best idea of what will be required.

The Welfare Centre Meeting.—We open at 2.30 p.m. on alternate Tuesdays, and at that time the mothers with small babies begin to arrive. The mothers of toddlers, who do not require to be weighed fortnightly, usually come at about 3 o'clock. Upon entering we find the walls covered with bright posters relating to health, infant management, cleanliness, the care of the teeth, etc. These are nearly all given to us free by various societies.

Registers and Charts.—Near to the door we find an officer's wife in charge of the attendance and numerical registers (printed forms are obtainable from the A.I.W.M.C.). Each mother on entering gives her number, and a cross is placed against her name in the date space provided. A newcomer states her name, address and husband's rank and unit. She is then provided with an infant's weight card which she takes to the weighing table, where particulars of the baby are taken down to be entered later in the Infants' Register. A convenient loose-leaved register is obtainable from the A.I.W.M.C. and specimens of a variety of record sheets will be sent on application. I should not, however, advise the use of a large number of records by a military centre, firstly because the time involved is too great

where no paid secretary is employed, and secondly because the officers' wives and the medical officer are in closer personal touch with the mothers than is possible at a large municipal centre. Personally I keep two record sheets for each child. The one a form on which weights and health notes are entered, and the other a weight chart. Where the medical officer follows the plan of examining each mother when she first joins the centre, together with her children as a family unit, special forms for this purpose can be obtained; these constitute a valuable record requiring comparatively little work in keeping up to date. This is especially useful in stations where there is no military families' hospital. In this case one of the helpers should be chosen to bring the newcomers to the medical officer and to enter up the family records. She should also have charge of the health of the toddlers, as these necessarily escape the vigilance of the weighing table. Many mothers fail to realize the need for medical treatment unless a child is definitely ill or in pain.

The Weighing of Infants.—But let us watch the weighing of the babies. As it is winter time a good fire is burning in a stove and round this the mothers sit to undress and dress their babies. This particular hall is so well provided with seats that plenty of spare chairs are available on which to lay the little clothes, but I have seen in use in other centres very practical wire baskets which clip on to the backs of the chairs. The weighing machine stands on a long table conveniently near, and is screened from draught by high wooden stands covered with washing dust sheets. A Pollard infant weighing machine is used, and this is placed sufficiently far back on the table so that a sitting-up baby can see the table close below, instead of gazing into the fathomless abyss from the machine to the floor. The basket or pan in which the infants are placed is padded with a soft Turkey towel, and a fresh piece of tissue paper is placed over this for each infant. The weighing is conducted by a fully certified nurse. Someone must assist her by filling in the particulars on the weight cards, and in the Infants' Register, so that she is able to give all her attention to the mother and babies. Occasionally an unusually nervous child is frightened by the process of being weighed. In this case we explain to the mother the necessity of teaching him to conquer his own fears, and warn her of the mischief that is often caused by using force to a sensitive child. I have found the following plan very successful with these cases. The mother is asked to wait until all the other children have been weighed. The machine is then placed on the floor and the mother invited to kneel on the floor beside it and play with her baby. (The child with sufficient mental development to be consciously frightened is never the young infant, but always the middle-aged or elderly baby.) One day we had two such cases, and very soon one small person began to realize the possibilities of the weighing machine as a means of dragging himself on to a very unsteady pair of legs. His gurgles of joy soon reassured his little friend, and the first lesson in facing the unexpected and trusting mummy had been learnt. The value of

this will be realized later if such children are obliged to receive hospital treatment. There is no excuse for a welfare centre which cannot devote infinite time and infinite patience to its minor problems. Unlike the hospital it has no serious cases. Its work is essentially educational, and its mission is not to replace the mother, but to teach her how to fulfil her part. The earlier centres were known as "schools for mothers." This name has in most cases been dropped, and rightly so, as it did not tend to raise the dignity of motherhood. Still it had one merit. No one can say in connexion with a school for mothers: "If you try to teach the mothers, they will be offended!" But however excellent the teaching, its effective value depends upon the confidence inspired in the mother, and she will only bestow her confidence upon us if she feels that we are not dealing with mothers collectively or in the abstract, but are in sympathetic personal touch with her and her child. In this connexion let us not neglect the lighter side. Those who have laughed together are the better friends.

I remember one mother showing unusual excitement at the weighing table and confiding to us that her sportsman of a husband had got up a sweepstake on the baby's weight! We are always delighted to hear of any amusement coming to a father in connexion with his baby. The early days of parenthood in a small home must inevitably mean considerable discomfort and inconvenience, and the young father does not always adopt a sportsmanlike attitude.

On another occasion a very young mother waited to ask me a question. She and her husband were in disagreement upon an important point and they had decided to take it to the welfare centre for arbitration. Baby had been christened "Dudley Esmond," father wished to call him "Dndley," but mother did so want him to be "Esmond"—which name would I chose? "Far be it from me," I replied, "to take sides between husband and wife, I shall call your child "Desmond"; "but, joking apart," I added, "if you really want my advice, let his father choose his name. Baby belongs equally to both of you, but while he is small and weak he depends almost entirely on you, and nearly all the decisions for his welfare must be made by you. That is why so many fathers feel that they mean very little to their babies, and begin to lose interest in them. And if you let your husband choose baby's name, don't you think that perhaps next time he is roused in the night by the screams of his first-born, he may bear more patiently the cries of 'Dudley' than of 'Esmond?'"

This all seems very unimportant, but baby's health and dawning mental development reflect very quickly the atmosphere of the home, and I once heard a speaker ruin an otherwise excellent address by offering the mothers this cruel and short-sighted advice: "If your husbands try to interfere, don't listen to them, just tell them that they know nothing about it."

Sale of Foods, etc.—We now come to the department where infant foods are sold at wholesale or greatly reduced prices. We keep in stock: Virol, Cow and Gate food, Ovaltine, Ovaltine Rusks, also toothbrushes. We

procure to order Allenbury's food and cod-liver oil and malt. At the oversea centre I also stocked Glaxo, and would do so in England, but, except for export, it is only supplied at special welfare centre prices in cartons and not in tins. This applies to a considerable number of other valuable products. I wish that other centres would support me in refusing to stock perishable foods unless supplied in airtight tins.

Clothing.—Our clothing department is becoming very popular. We supply paper patterns free of charge and also take orders for children's garments, supplied by a wholesale firm which makes them to the specification of the clothing committee of the A.I.W.M.C. These can be chosen from model garments kept on view or from catalogues. We also supply knitting wool in various colours. Both the food and clothing departments are run practically at cost price, as a benefit to the mothers and not as a source of income.

Literature.—To each mother joining the centre we give free, a copy of the excellent textbook issued by the A.I.W.M.C., "To Mothers and Fathers." (As far as possible we try to give these books to expectant mothers when or before they go into hospital.) We also give away a variety of books, pamphlets and leaflets which we obtain free from such organisations as the Health and Cleanliness Council, the National Milk and Publicity Council, the Dental Board of the United Kingdom, etc., also books containing useful information supplied to us by various manufacturing firms. We also stock copies of "The Mother's Cookery Book." These we either sell or give away in prizes.

Toddler's Playroom.—The welfare worker who has charge of the toddlers' playroom has by far the hardest work of any of the helpers. She is also cut off from the rest of her companions and is unable to listen to the lectures. We are trying to evolve a satisfactory system for relieving her during part of the time, but it is positively amazing how quickly a group of little angels can turn into something entirely different when they feel the absence of the personality with the gift of controlling them and keeping them interested. We have a large number of toys, all of which have been given to us, and we are very proud of our miniature furniture, a gay little red and white table with chairs to match. These were made for us by one of the artificers out of tea chests. We recently held a painting competition, the National Milk Publicity Council having given us large outline drawings depicting the eight Rules of Health. The Health and Cleanliness Council also gave us delightful little painting books and balloons with health mottoes.

Nursery.—Next to the playroom is the nursery. This is only used during the lecture hour, and it is a great pity that all mothers cannot be induced to part with their babies for this short time. Those which are brought to the lectures are often very disturbing. The nursery is furnished with cots containing chaff-filled mattresses, the mothers bringing their own pillows and rugs from their perambulators. The mattresses are not left at the centre, but are taken away and thoroughly aired before use.

Jumble Sales.—At each alternate meeting we hold a small jumble sale, which forms a valuable source of income to the centre and is of very real benefit to the mothers.

Teas.—At about 3.45 p.m. tea is served. We are fortunate in having the use of a large number of card tables round which the mothers form little groups. We charge 2d. per mother, and for this she receives as much tea as she wishes, also a buttered bun and a slice of plum cake. We have so far made no charge for the children, as the local civilian centre gives free teas to all its members, and as the deficit is extremely small, only 6s. 4d. on over 700 teas.

Health Talks.—Tea is followed by a health talk. This opens with a distribution of free samples. Whether the sources of supply will eventually run dry I cannot say, but so far every type of product has generously hearkened to my appeal—except soap! Health talks have already been given on the following subjects :—

“Fresh Air and Sunlight,” “The Common Cold,” “The Care of the Teeth” (Dental Lecture with cinema given by the Dental Board of the United Kingdom), “Clothing for Infants and Older Children,” “National Conference on Maternity and Child Welfare, an Account of Visits paid by the delegates to various London Institutions for Children,” “The Feeding of Toddlers and Older Children,” “Character Training,” “Thrush and Diarrhœa,” “The Preservation of Health in Tropical Countries,” “The Value of Milk as a Food” (lecture given by the National Milk Publicity Council) “Cases of Illness which might have been Prevented,” “Exercise, Occupation and Amusement.” Also a lantern lecture on the “Life of Women and Children in the Harems of Morocco.” We also held a debate on “Child Management,” at which the mothers were encouraged to tell their personal experiences, and we called this our “True Story Afternoon. Nothing out of Books!”

Of course, the majority of the mothers maintained complete silence, but some of them found courage to speak, and even the silent ones seemed greatly to appreciate the feeling that we were all mothers together and that an account of even the simplest little happenings in one mother's life may be of interest and help to someone else. For the assistance of those proposing to hold health talks, the A.I.W.M.C. has published a pamphlet called “Syllabus of Health Talks.” A series of addresses to mothers has also appeared in recent numbers of *National Health*, the journal of the National League for Health, Maternity and Child Welfare.

Further Activities.—The foregoing description does not profess to cover the whole ground of useful activities which can be, and are, carried on at welfare centres. It must be remembered that the centre described has only been in existence for seven months. Moreover, local conditions must be considered. For instance, we have not attempted to establish needle-work or knitting classes, as these are held by both the Mothers' Union and the Guild of St. Helena. Cookery forms a very important part of welfare

work, but we have not yet had time to deal with this subject, apart from holding a cake-making competition; while our arrangements for home visiting still leave room for considerable improvement. Other branches of work which I should like to see established are dental inspections of toddlers and expectant and nursing mothers, and an overseas settlement department, for giving information to wives of men about to leave the Army. Welfare is a very comprehensive term, and after visiting a London centre where among other activities I was shown artificial light and massage clinics, the medical officer informed me that any centre which has not got a section for fathers is only fifty per cent efficient! The fathers' section was in the nature of a club where lectures and debates were held on subjects including the following: "Juvenile Employment," "Elementary Education," "Venereal Disease," "Tuberculosis," "Overseas Settlement" while practical demonstrations were given in carpentry, boot repairing, etc.

Finance.—It is difficult to start a centre satisfactorily without money, and there is no greater extravagance than to purchase cheap make-shift articles with a view to subsequent replacement. Money must also be permanently tied up, if a stock of foods, etc., is to be purchased and maintained. The running expenses of a military centre should, however, be extremely low. If small monthly jumble sales are held, the proceeds should be sufficient to cover the running expenses and leave a margin for propaganda and for the gradual redemption of the initial cost of equipment and food stocks. Some centres receive a grant of £6 annually from the War Office; but the sanctioning of this grant depends, I am informed, not upon the efficiency of the centre but upon its geographical situation with regard to the nearest civilian centre. In many cases the cost of equipment, etc., can be met by means of donations, but where this is not possible, some solution should be devised whereby less well-to-do centres are not faced with the depressing alternatives of inferior equipment or debt. And even debt implies the existence of someone to lend the necessary money. Moreover, the chairman must be prepared to hand over the centre in a solvent condition at any moment when her husband may be ordered elsewhere. Under these circumstances, if instead of giving an annual grant of £6 to certain centres, the War Office would give an initial grant of about £15 to all centres conforming to an approved standard of efficiency, the ultimate cost would be lower and the assistance more valuable. This £15 could be allocated as follows:—

Cost of weighing machine, approximately..	..	£5	0	0
For purchase of stock of foods, etc.	..	8	0	0
For purchase of books, registers, etc.	..	2	0	0
		<hr/>		
		£15	0	0

The following statement covering a period of seven months and including the period of inauguration may be of interest. Total number of mothers enrolled, eighty-seven (this includes a few temporary members

whose husbands were on short courses at the station); total attendances, 595; average attendance, 37; maximum attendance, 52; minimum attendance, 23.

<i>Debit.</i>			<i>Credit.</i>		
	£	s. d.		£	s. d.
Purchase of saleable stocks ..	41	18 11	Sale of food, clothing, etc. ..	34	8 8
Purchase of equipment ..	12	12 10	Sale of books ..	1	18 0
Purchase of books and registers, Examination fees ..	5	16 10	Tea receipts, at 2d. per mother or welfare helper ..	6	7 3
Cost of teas ..	6	13 7	Proceeds of Jumble Sales ..	11	3 3
Affiliation fee to Association of Infant Welfare and Maternity Centres ..	1	1 0	Donations given to defray specific expenses ..	9	6 0
Delegates' tickets for National Conference on Maternity and Infant Welfare ..	0	17 6	Donation given to form fund for the purchase of saleable stocks ..	8	0 0
Hire of Cinema for Dental Film and Lecture ..	2	0 0	Value of stocks in hand ..	9	15 7
Postage ..	1	3 0			£80 18 9
Miscellaneous expenses including speakers' fares, prizes, gratuities, etc. ..	3	2 6			
	£75	6 2	Value of equipment ..	12	12 10
				£93	11 7

Organization.—A one-man show is an unsound show, and the ultimate object of the chairman must be the decentralization of the work. The helper who has the control of her department will feel more keenness and devote more time to it than she would otherwise do, and though the chairman must be prepared to give up a considerable portion of her time to the development of her centre during the first few months, it is neither reasonable nor possible for her to undertake to do almost all the work permanently. At the same time decentralization is not nearly so simple as one would at first imagine, as the ultimate responsibility both as regards finance and efficiency must rest with the chairman, while all her helpers are purely voluntary workers.

There is, however, another important side to the organization of welfare centres. I refer to organization from above, for which I and others have sought in vain. Why are we of the military centres not inspected, advised, assisted, encouraged or reprimanded by one greater than ourselves, sitting at the War Office, in the same way that civilian centres are watched over by the truly excellent organization of the Ministry of Health? We know that some central authority exists, because when we ask it for £6 it sends us very kind words, but even these are not words of guidance. How did it happen that last June when I attended the National Conference on Maternity and Infant Welfare I was informed that out of 700 delegates I was the one solitary representative of a Military Welfare Centre? (I had arranged to take our matron, but she was unavoidably prevented from coming.) And yet if all military centres had been circularized, asking them to send in the names of the delegates they appointed to represent them, a large number would have been glad to come. Why have

we no Mothercraft Shield to be won in annual competition between military centres? It is practically impossible for us to compete in an open class with the big municipal centres for the Shield of the A.I.W.M.C. Yet competition has an amazingly invigorating effect upon the vitality of a centre and upon the keenness of the individual mother. Why is no annual meeting held at which the heads of all military welfare centres can meet together and profit by one another's experiences?

Perhaps the time is not far distant when some member of the R.A.M.C. will devise a scheme for the strengthening of the military welfare centre movement through the creation of a central organization, possessing not only the knowledge which helps, but the belief which inspires. When this occurs he may rest assured of the enthusiastic and loyal support of all those who, from practical experience, realize the moral effect produced upon local activities by a stimulating and vigorous headquarters policy.

NOTE.—The above is intended to apply to the case of the average Military Children's Welfare Centre at home and abroad. It is not applicable to the case of certain centres possessing their own specially built accommodation and residential nursing staffs. Such centres can only exist in commands where exceptional financial resources are available.

PRACTICAL POINTS IN MODERN MIDWIFERY.

BY MAJOR W. McKIM H. McCULLAGH, D.S.O., M.C., F.R.C.S.

Royal Army Medical Corps (Militia).

Now that the birth-rate in Britain is 16 per 1,000, the lowest in Europe, whereas in 1914 it was 24, one's thoughts turn to economy in the lives of pregnant women and infants.

For practical purposes there are four great dangers in a confinement case. Two occur before the birth of the child—eclampsia and obstructed labour, and two after—post-partum hæmorrhage and sepsis.

A review of the case and the management of a normal pregnancy includes the elimination of these dangers.

The first upset to the future mother's normal health is the morning sickness, which occurs in fifty per cent of primiparæ and is present at intervals from the sixth to the fourteenth week of amenorrhœa. Its treatment depends for its most successful result on assuring the patient that it is part of the necessary inconvenience of a pregnancy and that when she feels sick she is to disappear and be sick, and then return to what she was doing, even to finishing the eating of a meal. The appetite is but seldom impaired, but if so, removal to hospital, or a short holiday at her own people's home, soon removes the complaint. I have found the ordinary mist. gent. alk. one ounce a.c. the most satisfactory of the many remedies recommended. It is to be remembered that sickness, even sea-sickness, is associated with acidosis, so that saline aperients, avoidance of proteins and a carbohydrate diet are indicated. Corpus luteum extracts, e.g., sistomensin, luteofolin, I have found of assistance.

Abortion is most likely to occur at any time the normal period would have occurred, particularly the third, i.e., at two and a half calendar months or the twelfth week of amenorrhœa.

All excitement, dancing, coitus, jolting on vehicles, and very hot baths have to be forbidden at these times. Should pains and a hæmorrhage occur, the patient should be put to bed instantly, given an injection of morphia or omnopon, and kept there for one week after hæmorrhage has ceased. Daily doses of calcium lactate and corpus luteum are of assistance.

Retroversion is a common cause of abortion, and if found should be corrected and treated by a soft pessary for a few weeks. If, however, the retroverted uterus is adherent, it is best not to interfere beyond giving liquid paraffin one ounce t.d.s. and advising the patient to sleep and lie as much as possible in the prone position until the uterus arises out of the pelvis.

The quickening of the child, felt at the sixteenth week in multiparæ and the eighteenth week in primiparæ, is marked by a hopefully expectant

outlook on the mother's part. She is, however, liable to alter her normal life to her own detriment, and be a prey to the warnings of over-anxious friends. A useful corrective, and one of great assistance, is to present one's patients with a copy of Truby King's "*The Expectant Mother and Baby's First Month*," with instructions to read the first twenty-four pages. It is idealistic in outlook, but very sound in urging moderate exercise, fresh air, avoidance of constipation, care of the teeth and proper support for the breasts if necessary.

The advent of the twenty-eighth week, when the child becomes viable, reminds one of the first danger, eclampsia. Its incidence is about 1 in 350 labours, and seventy-five per cent cases occur in primiparæ. It does not occur if patients are subject to antenatal attention.

A fortnightly examination of the urine from the twenty-eighth week and a weekly examination for the last six weeks should be made in every case as a routine. A heavy cloud of albumin, oliguria, and a high blood-pressure mean instant danger, requiring absolute rest in bed, copious drinks of water, barley water, orangeade, and nothing to eat except a few biscuits and barley sugar. If she does not very markedly improve in a few days labour must be induced.

About the thirty-second week, when distension of the abdomen becomes grossly apparent, a much appreciated suggestion is the massaging of the abdominal wall, and breasts if necessary, with a cosmetic cream, or even olive oil twice weekly in order to avoid the unsightly marks caused by the *lineæ gravidarum*.

At the thirty-fourth to the thirty-sixth week the second danger of obstructed labour must be considered.

Breech presentations number three per cent, and it is most important to do an external version on all these cases in view of the high mortality to the child. Some series give up to a forty per cent mortality. About seventy-five per cent of foetal deaths in these cases are due to intracranial injury to the after-coming head, which requires dexterous and not forcible delivery.

Extending legs do not cause obstruction. It is safer for the child to ease the posterior buttock over the perineum with the finger and not to bring down a leg. Version, however, should take place in all breech presentations and under an anæsthetic if necessary.

Contraction of the pelvis is best measured by the foetal head, which is the best pelvimeter. It descends in primiparæ about the thirty-sixth week and should always be capable of being pushed into the pelvis. If it cannot be pushed down and up to one-quarter inch overlapping is present; induction should take place as the head will mould through. If a quarter inch to a half inch is present medical induction and a trial labour should be allowed to take place, so that if strong pains fail to engage the head a Cæsarean section may be performed.

After the birth of the child one's fears turn to post-partum hæmorrhage and sepsis. Most cases of the former are due to premature efforts at

expressing the placenta. It must be realized that it takes time, usually twenty minutes, for the uterine cavity to contract from the volume which proved too big for the child to one which proves too small for the placenta. When that occurs the placental site will be too contracted to bleed.

No interference should take place for one hour after the childbirth, when, if the placenta is not delivered, the classical Credé method of expression, under chloroform, if necessary should be tried. This consists in compressing the anterior and posterior walls against each other when a contraction of the uterus is present. Failing this, manual removal with its attendant fears of sepsis will have to be adopted, but this is rarely necessary.

Sepsis is responsible for an enormous amount of ill-health amongst women and is most commonly caused by miscarriage with infection in early pregnancy. One in 400 pregnant women die of sepsis and six times this number are affected by an acute or mild form.

Proper antenatal attention as regards teeth, bowels and open-air exercise, with a minimum of interference at childbirth, are our main hope in its reduction. I strongly advise the use of maternity dressing tins as I have seen several cases of upward infection from a perineal tear due to using non-sterile diapers.

Fixing the mother in the Fowler's position for five days after delivery I insist on in all maternity patients. After this there is but little danger, so she is allowed to lie flat on the bed if she wishes. In the second week, by making her lie prone for half an hour in the morning and half an hour in the evening, the danger of retroversion of the uterus is avoided. This condition is serious to the mother in that it is associated with subsequent backaches, miscarriages, depression, dyspareunia and daily frequency of micturition. It is mainly due to prolapse caused by insufficient treatment of a perineal tear, bearing-down efforts before the os is fully dilated or allowing the mother up too soon. It is advisable to keep all patients in bed for three weeks after delivery on this account.

Placenta prævia, the frequency of which is 1 in 250, once diagnosed must be treated forthwith. The methods adopted now are rupturing the membranes at the side of or through the placenta and plugging with gauze, or attaching a Willett's forceps to the scalp of the child with a two-pound weight extension to the handle. This stops the bleeding, brings on labour and gives the foetus the best chance of life, unless Cæsarean section is undertaken for its sake.

Twilight sleep is not popular, owing to the trouble entailed and the exaggerated fear of death of the infant from blue asphyxia.

Personally I advise giving chloral hydrate twenty grains, pot. brom. forty grains, after pains have started and castor-oil has been given. As the pains become more evident I give half a cubic centimetre of omnopon if the membranes have not ruptured, and later on a self-induced chloroform anaesthesia. This is arranged by attaching a Junker's bottle to the head of the bed

and placing the bulb of the apparatus in one hand of the patient and a perforated mask in the other with directions to hold the mask to her face and blow hard by compressing the rubber bulb when she feels the pains begin. It works excellently if she is warned to work the apparatus rapidly when the pains commence, as when they are at their height she is unable to inspire.

The tendency of midwifery at present is towards more antenatal care and non-interference at delivery. The forceps are less commonly used. Medical induction is tried before instrumental means of induction are adopted. Cæsarean sections are decreasing in number. Only two conditions are looked on as warranting direct action in labour—immediate danger to the life of the mother and immediate danger to the life of the child.

SIGNALLING THE APPROACH OF A TYPHOON AT HONG KONG.

BY COLONEL S. F. CLARKE.

(Retired Pay.)

THIS article was written nearly thirty years ago, and the method of conveying warnings of typhoons may have been changed since those days.

Like most things, typhoons have a season, and their periods of activity, as far as Hong Kong is concerned, are summarized in this piece of doggerel :—

June, too soon ;
 July, stand by ;
 August, you must ;
 September, remember ;
 October, all over.

* * * * *

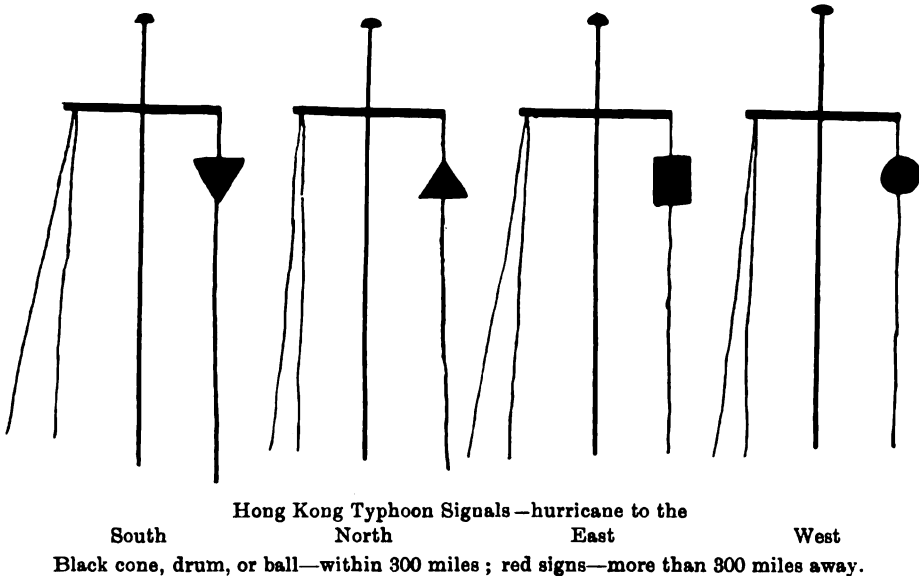
"A depression is reported east of Luzon, moving in a N.W. direction." These words appear at intervals in the local papers during the hot season at Hong Kong. They mean nothing to the newcomer, but the old resident knows that this innocent looking paragraph is the first warning of a typhoon that may cause fearful destruction, and he watches the papers carefully for news of its progress. Nobody, however, says much at this early stage.

Next day the depression is reported to be still moving north-west, and people now say to each other that another typhoon is crossing from the Philippines. Presently the atmosphere gets oppressively hot and sultry, the breeze dies away, and it is obvious that the disturbance is coming closer. The sky then rapidly becomes overcast, rain falls, and a red south cone is hoisted on the harbour signal flagstaffs. This is the first official warning, and it means that a typhoon exists to the south of the Colony, but at present is more than 300 miles away. The fact that "the red cone is up" now becomes a universal topic of conversation, and everybody asks will the hurricane really come this time, or will it go off elsewhere as so many do?

The junks and sampans (small boats) in the harbour now show great vigilance, and the more cautious ones retire at once to the shelter provided for them by a special breakwater. Under their own sails and oars they go down the harbour in a regular procession, and the passage of this mosquito fleet is quite a pretty sight.

The signs of bad weather soon become more marked, the hills are hidden in fog, the clouds grow darker, and the wind freshens. All eyes are on the signals, and when the red cone is displaced by a black one—showing that

the typhoon is now *less* than 300 miles away—preparations to meet it begin in earnest. Every junk and sampan that has not yet moved, seeks refuge ; many of the large ones go over to the north side of the harbour and anchor in the bays there, while the smaller all make for the shelter within the breakwater until the enclosed piece of water there becomes a closely packed mass of boats. Many still make their own way down—creeping along the shore—but, as time is now precious and the wind and sea are rising, most of them engage the services of steam launches to take them along. This is a most curious and interesting sight, for each launch takes as many boats as it possibly can, all so closely fastened together that often the launch itself is lost to sight in the crowd, and it looks as if an immense raft were moving along. So large is the raft that the launch can barely move, and



the whole affair proceeds down the harbour at such a snail's pace that one feels inclined to back the typhoon to arrive first. A second launch often has to assist, and it also gets lost quickly in the mass of small craft. Several of these "rafts," in all stages of growth, move in one direction, while disengaged launches steam back eagerly for fresh engagements. When the boat people think that the raft is large enough—and that is only when it can just keep moving—they resent fresh additions, and any sampans trying to join on are driven off by boathooks and missiles. These newcomers persist in their efforts and return the fire, so that a certain liveliness is sometimes evident at the circumference of the mass.

Eventually all the small craft reach shelter, or, if they delay too long, are capsized, so that of the hundreds of boats that usually dot the harbour not one is to be seen ; they are all either packed tight behind the break-

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water, or lying in little fleets in the more precarious refuge of the bays of the north side. The ferry-boats and other launches are still at work, but as time goes on, matters get too bad for them, and when eventually the typhoon gun is fired—the signal that the cyclone is on the point of arriving—*saue qui peut* is the word, and they in turn vanish from the face of the waters.

The large craft are now in sole possession of the harbour, and they have not been idle all this time. The few sailing ships strike their topmasts, put out extra anchors and hope for the best. Some of the steamers run for the bays, but most of them prepare to ride it out where they are. Awnings are taken in, boats lashed down, topmasts lowered, and steam got up. It is very striking to see vessel after vessel giving out smoke in preparation for the struggle—it is like serving out ammunition before going into action. The men-of-war disdain to seek shelter, but they get up steam, have extra anchors handy, and make all other necessary preparations. The deep-sea ships are now ready—they have not fled like the small craft, but purpose fighting the typhoon hand to hand.

All this time the wind has been fast increasing in force, moaning and shrieking, and great gusts swoop down with torrents of drenching rain; the clouds get blacker and blacker and move ever faster, the sea foams and heaves, the waves rise as high as the wind will let them, and it is evident that the Colony is in the grip of the dreaded typhoon. Between the blinding squalls of rain the big ships can be seen plunging and straining at their anchors. They are all “stripped,” but the storm is now blowing fiercely, the wind is whistling and howling like a living thing, the sea is running high, and the ships writhe and plunge and jerk at their cables so furiously that it looks as if something must give. Although the engines are going full speed ahead, several of them drag their anchors, while one or two evidently think that they are out-matched by the elements, and take advantage of the last few gleams of daylight to run into one of the more sheltered bays. This is no easy task, because for several days ships have been constantly coming into harbour and none going out, so that it needs skill and seamanship to avoid collision in a hurricane like this. But they slowly stagger along, rolling and pitching and picking their way till they cast anchor in greater security.

There is usually no lightning or thunder, but the booming of the wind and the crash of the seas make quite noise enough. For several hours the storm rages, though when plenty of warning has been given as a rule no great damage is done at sea, but in November, 1900, a most disastrous typhoon passed over the Colony. It was not the proper season for these visitations, so the warnings were rather disregarded, and many boats neglected to shelter in time. The centre of the typhoon passed over Hong Kong, so that the wind completely changed its direction and all the small craft that had run to the bays suddenly found themselves on a lee shore. The destruction that ensued was terrible—junks and sampans

went down in scores or were dashed to pieces, and for miles the shore was strewn with wreckage. Many large junks that sank became dangers to navigation, and had to be removed afterwards. Steam launches shared in the general disaster, and even H.M.S. "Sandpiper"—a vessel of shallow draught built for river work—went to the bottom. She fired the only minute guns of distress that I have ever heard—strange sounds in a harbour!—and they brought the destroyer "Otter" to her aid. In the height of the hurricane this vessel forged her way right across, and by masterly seamanship succeeded in rescuing all the crew save one, who was crushed. The bows of the gallant "Otter" were crumpled up, and the risk of her sinking in the wreck-strewn water was very great. Another daring deed was the rescue of the crew of the capsized dredger by blue-jackets of the "Tamar," who took their lives in their hands in an open rowing boat. This dredger was a large vessel, newly arrived, and the operation of righting her was one of the feats of Sir Percy Scott, of H.M.S. "Terrible," in China.

The people who live on shore must also make their preparations for meeting the emergency. Shutters are closed and securely bolted, the typhoon bars are placed over the windows, and all doors are carefully fastened. A supply of food is laid in by cautious folk, and artificial light is everywhere made use of. All traffic stops, and the wind runs riot like a conqueror through the empty streets of the captured city. Every here and there a house collapses with loss of life, roofs and tiles are lifted off, windows blown in, and in bad cases the inhabitants have to take shelter in the cellars. Trees are blown down or stripped of their leaves, telephone wires fall across the streets, and sometimes even the thick iron posts that support them are bent by the wind.

Gradually the barometer, which has fallen rapidly, begins to rise again—in November, 1900, the barograph recorded a long and sharp "V"—the gusts become lighter and less frequent, and in a few hours the wind has gone, and things gradually resume their usual condition. The mosquito fleet sallies out from shelter, and the interrupted business of the Colony once more gets into full swing.



Editorial.

THE MEDICAL DEPARTMENT OF THE UNITED STATES ARMY IN THE WORLD WAR.

GAS WARFARE.

VOLUME XIV of the American history deals with such problems of gas warfare as concerned the Medical Department either directly or through its affiliation with the Chemical Warfare Service. This means something more than might at first be anticipated, for in the preliminary stages of preparation for war the whole responsibility for defensive measures was allotted to the Medical Department.

As gas warfare was well established before the entry of the United States into the war, this history lacks the dramatic element which is so evident in our own history of the early days of the use of gas. Furthermore, the history of chemical warfare in other nations is not touched on, the editors definitely restricting the work to matters concerning their Medical Department during the period of the World War. By so doing they have been able to devote much space to the accurate recording of these matters, and have produced a volume which should be of great value as a work of reference. At the same time, the book loses in interest for the general reader and lacks that completeness of survey which would attract the student. This policy has been deliberately adopted and, in the introduction, the reader who desires to study the subject in all its aspects is advised to turn to the published books and official reports for a complete survey of the subject.

The material seemed naturally to fall into three sections :—

- (1) Organization and administration of the gas services.
- (2) Clinical features of gas poisoning.
- (3) Experimental researches.

The first section commences with an account of the early arrangements in America, among which the supply of protective appliances had priority. The necessity for anticipating demands of this kind had been foreseen, and as early as November, 1915, the Medical Department had assigned to it the responsibility of arranging for both design and supply, apparently on the grounds that this work did not come under any other department and that the medical services were the most competent to deal with such matters.

Accordingly the Surgeon General despatched representatives to the European armies to study and report on their methods. The development of this work resulted in the specialization of a "Gas Defense Service," organized as a division of the Surgeon General's office, with personnel

specially chosen and allotted. After the declaration of war with Germany, the further problem of the instruction of all arms in defensive measures became urgent, and in July, 1917, the Medical Department was called on to furnish instructors. In the following October and November, these were assisted by British officers, twenty-seven of whom were sent to the U.S.A. for the purpose. Their names are given in an appendix.

As the study of chemical warfare progressed, and the interdependence of offensive and defensive measures became more marked, there was a gradual transfer of the responsibility for defence to other branches of the army. In February, 1918, the field training section of the Gas Defense Service was transferred to the Engineers' branch, and in July, 1918, a new organization, the Chemical Warfare Service, came into existence. This relieved the Surgeon General of responsibility for defence as far as troops outside the Medical Department were concerned, but the new service continued to employ large numbers of officers and men of the Sanitary Corps, and close liaison with the Medical Department was maintained.

While these developments were going on in the U.S.A., there was a corresponding activity in the American Expeditionary Force in France. Here the organization was developed from reports furnished by officers who had been attached to the French and British Armies. Regarding one of the latter, a medical officer, it is stated, "He carried with him to Headquarters, American Expeditionary Forces, a large number of valuable and instructive documents, which, together with those already in the hands of the acting chief of the Gas Service, furnished a skeleton of practically the entire system of gas attack and defense as employed by the British and French."

In July, 1917, a "Gas and Flame Service" was established as one of the branches of the staff of the Expeditionary Force. The Medical Department was represented on the staff of the chief of this service by a medical director, who maintained touch with the chief surgeon of the force with regard to the general organization for both offence and defence. Questions relating to the handling of casualties were, of course, dealt with by the Chief Surgeon, who was thus kept fully informed of all developments.

As in the home country, training of all branches in chemical warfare was at first placed in the hands of medical officers, assisted by chemical advisers and furnished with pamphlets prepared by the British military mission. Very soon, however, the responsibility of the medical services for training became limited to their own personnel and, owing to the large numbers arriving, even this was very difficult. Every possible means of collecting and disseminating information had to be employed, including conferences with the Allies and distribution of circulars and bulletins from Headquarters and of books issued by the American Red Cross.

The difficulties in ensuring adequate instruction in the management of gas casualties for all medical officers resulted in excessive wastage from evacuation of cases which might have been returned to the line. An

indication of the extent to which this took place was afforded by a comparison of the mortality rates among cases evacuated as gas casualties in the different armies. In the British and French Armies the mortality was from 3 to 4 per cent. In the American armies it was less than 2 per cent, this low figure being attributed to the fact that a large number of reported cases of exposure to gas were really suffering from other causes. By the appointment of specialist gas medical officers to each division during September and October, 1918, an improvement was effected. These officers carried out supervisory and instructional duties in their divisions.

The hospital organization of the Expeditionary Forces was similar to that of the Allies, in that at times special hospitals were devoted to the treatment of gas cases. A scheme for allotting three special mobile gas hospitals of 1,500 beds to each corps was proposed, but did not materialize. Degassing stations were established on similar lines to those in the British Army and were administered by the medical services.

For research purposes an experimental gas field, occupying about twenty square miles in the neighbourhood of Chaumont, was acquired, and its physiological and pathological sections were staffed by personnel of the medical and sanitary corps.

A brief chapter on the classification and methods of use of war gases is followed by an account of the field arrangements for gas defence and the care of gas casualties. This consists mainly of verbatim extracts from reports and memoranda. The general principles adopted by the Allies appear to have been followed.

The sections on clinical features and experimental researches occupy about three-quarters of the volume, and it is impossible in this notice to give more than the barest indication of their scope. The chapter on clinical features is, as might be expected, mostly concerned with the effects of mustard gas, since this was the principal chemical casualty producer during the last years of the war. The policy of recording details instead of summing up conclusions is continued, even to the extent of including autopsy protocols of 107 fatal cases.

The third section contains reports of the researches carried out in America during the war under the names of the workers concerned. They are very well produced and are profusely illustrated with instructive drawings and photographs of high quality.

Clinical and other Notes.

A CASE OF STOVARSOL POISONING.

BY MAJOR F. D. ANNESLEY, M.C.

Royal Army Medical Corps.

Previous History.—The patient, an officer of the Indian Medical Service, aged 30, had ascertained that he was harbouring cysts of *Entamoeba histolytica* and had been taking stovarsol, four grains twice daily for twelve days; and after an interval of ten days, four grains twice daily for another twelve days. The total amount taken is thus seen to be about 200 grains.

Condition on Admission.—The patient was first seen by me on October 19, 1927, when he had a papular rash on the face, neck and trunk, also to a lesser degree on the extremities. This was accompanied by œdema of the face and neck. Papules were also present on the buccal and palatal mucous membrane which was injected and swollen, causing much pain on swallowing. These symptoms had commenced a day or two previously, which was just about three weeks after he had finished the second course of stovarsol.

The following day he was admitted to hospital. The condition had then become aggravated and he complained of feeling very ill. His temperature was 104° F. and pulse 106. The rash in some ways resembled an urticaria, but he could give no history of taking any food that might have been likely to cause it. He was questioned as to the possibility of it being a serum or drug rash, but his replies were in the negative on these points. His bowels had been freely opened during the previous two days, calomel and salts having been given.

He was put to bed and ordered calcium lactate twenty grains t.d.s., also a pot. chlor. mouth-wash, lotio calamine to be applied to the skin, and given a fluid diet.

Progress of Disease.—October 21: Morning temperature 101° F., pulse 112. Evening temperature 103·8° F., pulse 120. The rash was spreading on the extremities and the throat condition becoming worse. In some places on the neck and in the groins the rash had become vesicular and serous fluid was being discharged.

October 22: General condition much the same.

October 23: The rash on the body had subsided to a mottling, whilst on the legs it had changed to patches of purpura. That evening the history of his having taken stovarsol was extracted for the first time.

October 24: Temperature remained up. Throat and mouth conditions

were much better, the stomatitis having quite cleared up. However, the face and neck condition was worse, the rash having become vesicular with free oozing from these areas and also from behind the ears and in the axillæ and groins.

October 25: A blood culture was made on the 24th, but remained sterile. Urine contained no abnormal constituents. Face, neck and ears had become crusted with the serous discharge and lin. cal. was applied. The rash on the trunk as well as on the lower extremities had become purpuric. It having by now been definitely decided that the symptoms were due to stovarsol poisoning, ten cubic centimetres of sterile sodium thiosulphate solution (containing 0.5 gramme) was injected intravenously at 3 p.m. There was no reaction. The administration of calc. lact. had already been stopped.

October 26: Another 0.5 gramme of sodium thiosulphate was given intravenously and for the first time the temperature dropped to normal in the evening.

There was then no improvement in the condition of the face. The whole of the back and the upper part of the chest were tending to desquamate and leave raw areas exposed.

October 27: 0.5 gramme sodium thiosulphate was given intravenously at 2.30 p.m., and half an hour afterwards patient had a rigor, his temperature rising to 104° F. Skin condition much the same.

October 28: Eyelids and scalp became affected, the area of sensitization having spread. Patient was very drowsy all day and his general condition was the worst it had yet been. 0.4 gramme of sodium thiosulphate was given and no rigor followed.

October 29: Decided improvement in the skin condition since the previous day; 0.4 gramme sodium thiosulphate given and no rigor followed.

October 30: Large areas of skin on legs, thighs and forearms about to desquamate. No sodium thiosulphate given.

October 31: 0.45 gramme sodium thiosulphate given. Temperature rose to 104° F., but patient only had a very slight rigor. The condition of the eyes, face and neck was better. Everywhere else there was very extensive desquamation.

November 1 to November 6: Patient improved daily.

November 7: As the face and scalp tended to relapse slightly it was decided to recommence the sodium thiosulphate injections and 0.35 gramme was given. No reaction followed.

November 8: 0.4 gramme sodium thiosulphate given. This was followed by a severe rigor, patient's temperature rising to 102° F.

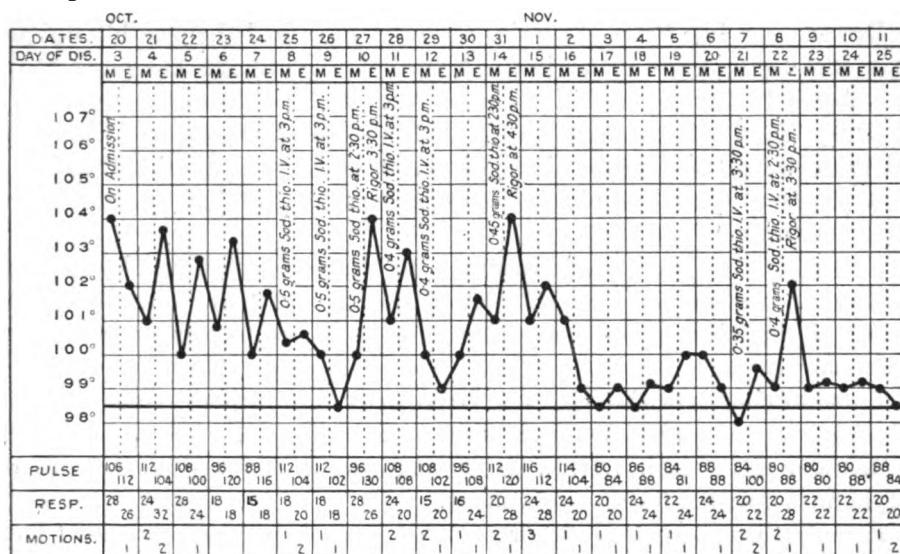
November 9: It was decided to discontinue the intravenous injections sodium thiosulphate and give twenty grains orally instead, three times a day, commencing on the 10th; this was done.

November 16: There had been an uninterrupted improvement during the previous week, so the oral administration of sodium thiosulphate was discontinued.

November 30: An extreme dryness of the skin of the face persisted for nearly a fortnight, but the patient had by this date practically recovered.

December 6: Patient discharged.

I append a temperature chart relating to the patient's first three weeks in hospital.



COMMENTS.

(1) This case emphasizes the fact that stovarsol should be administered circumspectly, in case the patient has an idiosyncrasy to arsenic. Some individuals may not be affected (as another officer in the same unit as this patient had taken a similar quantity and had no ill effects) but then again others may. The possibility of the cumulative effects developing some time after the drug has been withdrawn (in this case three weeks) should be borne in mind.

(2) Regarding the treatment. I cannot explain the causation of the rigors unless they were due to impurities in the solution of sodium thio-sulphate. As this was a locally (Shanghai) made product, I had no guarantee with it. Anyhow they did the patient no harm. As to the oral administration of the drug, the patient never experienced any colic, which is said sometimes to occur.

(3) Finally, I may add that the patient was an Indian, and not a European. I am not aware if idiosyncrasy to arsenic preparations is more common in Indians, but I do know that when giving salvarsan derivatives to Indian patients the usual doses must be modified.

I am indebted to Lieutenant-Colonel D. Ahern, D.S.O., R.A.M.C., Officer Commanding No. 7 General Hospital, Shanghai, for permission to publish this case.

ENTOMOLOGICAL NOTES.

BY MAJOR J. E. M. BOYD, M.C., F.E.S.

Royal Army Medical Corps.

DURING my two tours of service abroad I have had the possibly unique experience for a junior officer in the Corps, of serving one complete tour, from April, 1909, until mobilization in August, 1914, in one station, with the exception of the hot weather of 1910 which was spent at Dalhousie. But those were the "good old days" when three months' shooting leave was a yearly occurrence and so the discomforts of the hot weather were worth enduring.

In my second tour I again returned to the same station, Ferozepore, for the cold weathers of 1924-25 and 1925-26, and so was able to secure records of the local anophelines which may be of use to anyone interested in the subject.

I was in charge of the Brigade Laboratory, Ferozepore, from 1912 to 1914, and so was able to train the laboratory assistant, ward servant, now ex-Havildar Hira Lal, I.H.C., in distinguishing the several species of anophelines found in the cantonment.

Hira Lal was apparently interested and carried on the work after I left, keeping excellent records, so that when I returned in 1924 I was able to work out quite useful data regarding the incidence of the insects. These data are given at the end of these notes.

As Ferozepore is only about fifty miles from Lahore cantonment, the latter station being at present the apparent centre of antimalarial schemes, the probability is that the dates of incidence coincide, within reasonable limits, for the two stations.

The following list gives the species of anophelines found in Lahore cantonments :—

- A. fuliginosus* Giles.
- A. stephensi* Liston.
- A. culicifacies* Giles.
- A. rossii* Giles.
- A. pulcherrimus* Theobald.
- A. sinensis* Wiedemann.
- A. barbirostris* Van der Wulp.

The following additional species are recorded as having been found in Lahore Fort.

- A. willmori* James.
- A. maculatus* Theobald.
- A. funestus* var. *listoni*.

At Ferozepore the following have been caught :—

A. rossii Giles.

A. culicifacies Giles.

A. stephensi Liston.

A. fuliginosus Giles.

In the accompanying table the species of the adults are given, larvæ are simply denoted as such, the species not having been worked out.

TABLE SHOWING THE EARLIEST AND LATEST DATES ON WHICH LARVÆ AND ADULT ANOPHELINE MOSQUITOES HAVE BEEN FOUND IN FEROZEPORE CANTONMENT, PUNJAB, FROM 1914 TO 1925.

YEAR	LARVÆ				ADULTS			
	Earliest		Latest		Earliest		Latest	
1914 ..	September 8	..	October 9	..	July (R.)	29	..	September 28 (R.)
1915 ..	June 22	..	November 6	..	June (R.)	24	..	November 14 (R.)
1916 ..	September 8	..	September 29	..	July (R.)	23	..	October 29 (R.)
1917 ..	July 25	..	October 17	..	April (R.)	2	..	December 14 (R.)
1918 ..	September 3	..	October 7	..	August (R.)	29	..	November 4 (R.)
1919 ..	July 18	..	October 19	..	March (R.)	24	..	October 25 (R.)
					August (C.)	10	..	September 1 (C.)
					September 10 (S.)	..		
1920 ..	July 27	..	October 26	..	June (R.)	12	..	October 20 (R.)
					July (C.)	23	..	
1921 ..	August 15	..	October 22	..	August (R.)	11	..	October 11 (R.)
1922 ..	July 27	..	November 14	..	July (R.)	5	..	October 29 (R.)
					September 9 (C.)	..		
1923 ..	August 18	..	October 5	..	August (R.)	12	..	September 29 (R.)
1924 ..	September 5	..	November 5	..	September 16 (R.)	..	..	October 14 (R.)
					September 5 (C.)	..		
1925 ..	July 12	..	October 30	..	July (R.)	2	..	August 30 (R.)
					August (S.)	30	..	
					September 3 (F.)	..		

R. = *A. rossii*. C. = *A. culicifacies*. S. = *A. stephensi*. F. = *A. fuliginosus*.

Travel.

KULTUR AND KUR IN A COUPÉ.

By U. P. A.

(Continued from p. 302.)

The Black Forest.—Ettlingen is seven miles south of Karlsruhe. It stands at the entrance to the valley of the Alb and is called "The Gate of the Black Forest." From it you can see the wooded hills of the Schwarzwald raising their heads above the heat haze away to the south.

However, do not let pet names colour your anticipations or prejudice your judgments. Herrenalb, "The Pearl of the Black Forest," does not resemble a pearl, even remotely. Lindau, "The Venice of the North," isn't a bit like Venice. Würzburg, "The Rococo City," is only one of a dozen such cities. Even Ettlingen, for aught we know, may be sailing under false colours, since Pforzheim, a neighbouring town, is also called "The Gate of the Black Forest."

When the book says that Mangold-am-Wurzel is "The Star of the Pfalz," Fritz believes it, tells you all about it and expects you to enthuse even before you have seen the place. A douche of English scepticism may damp his cultured propaganda, but it won't extinguish it because it is not manufactured for English consumption; it is intended specially for the benefit of the sons of the Land of Liberty. The American is forever up against the publicity agent; his title to live depends on his ability to discount the persuasions of the professional propagandist. If he succumbs, he stays at home and pays on the instalment system. If he survives, he saves enough to do the Grand Tour.

But even the Grand Tour may be paid for by instalments.

After Ettlingen, Frauenalb, dominated by the tall, graceful ruins of its ancient nunnery-church. Then Herrenalb, once the site of an important monastery, now a place of Kur.

In the evening we listened to a Kurkonzert, by the Kurorchestra, in the Kurgarten of the Kurhaus.

It is commonly said: "Ah—Germany! that is the place for good music."

It is seldom remarked that it is also the place for bad music.

The Herrenalb orchestra consisted of about twenty skilled players led by an accomplished conductor-violinist. When they played good music they went through it with exactitude and decorum, and the large audience applauded according to plan. When they played ragtime and jazz they let themselves go; it was difficult to say whether the conductor was a musician or an acrobat, and the audience shouted for more.

Young Germany is perfectly happy in Alabama, despite the good music legend.

Next morning the car was put at a steep hill which began at the door of the hotel and continued for four miles up to Dobel, a wind-swept hamlet at 2,330 feet, and 860 feet above Herrenalb. Of course we rushed it, till half-way up, when a clumsy wagon, drawn by a pair of cows, blocked the road. That is one of the drawbacks to motoring in the mountainous parts of Germany; huge lumber wagons everywhere; and they always seem to pull up and rest on the steepest parts of the roads.

Also, the roads are old, narrow, winding, and unevenly graded. They were made for slow, heavy vehicles only; the fast, light car, cannot use her flexibility and dodging qualities at all when faced with lumber traffic. On a difficult, wooded, mountain road, a team of six—cows and horses mixed—harnessed to a float from which is suspended a pine tree 80 to 90 feet long is an obstacle with which one cannot afford to take risks.

The descent through beautiful forest scenery to Bad Wildbad followed.

In pre-war days there was an English colony at Wildbad; now the place is half empty. The Black Forest tourist and Kur business have been hard hit. Hotel proprietors and Kur officials tell you that this is due to two factors: post-war shyness of enemy nationals, and the general impoverishment of Europe. However, Americans are neither shy nor impoverished; you meet them everywhere.

Past Wildbad the valley opens out: spaces are cleared for cultivation and lumber mills swallow the trees and discharge hundreds of yellow, fragrant planks.

The road ascends again to an altitude which bears the marks of winter storms; stunted grass, scarred pines, tumbled rocks. We lunched beside a lonely, black tarn. A chilly, mist-laden wind whistled through the glen and made us shiver.

Ever ascending, we passed through Simmersfeld, and, as the sun dispersed the mist, reached Besenfeld at a height of 2,700 feet. Here our eyes feasted on a glorious view over hills, valleys and forests, away and away to the west, where the plain on the far side of the Rhine melted into the horizon.

The descent was short and sharp; so steep that, at one sector, I felt it safer to run the coupé in low gear for half a mile; the gradient and the numerous "Safety First" signs begat caution. Within a few minutes we ran through Schön Münzach, thirty-five miles from Herrenalb.

Here the hotel is fitted out like a shooting box. The landlord is a keen shikari and the dining-room contains some fine heads.

We were placed at one end of a long refectory table. At the other end was an elderly fellow-countryman—the only one we ever met in unoccupied territory—who growled a "Good-morning" at breakfast, strafed the waitress during lunch and buried himself in the *Times* at supper. Otherwise he was quite a nice old man.

On the following day we set out for Baden-Baden, via Gernsbach and the Eberstein ruin: an interesting drive, over fair roads much encumbered with timber floats.

Quite apart from "the well-appointed pump-room, medicinal baths, inhalatoria, emanatorium, and one of the strongest radio-active springs in Germany," Baden-Baden is just the place in which to pass a respectable, albeit decrepit, old age. We pottered about its clean, quiet streets, and appreciated its air of pre-war courtesy and gentleness. I doubt if it would tolerate a jazz drummer. It would not lynch him, but it would pay his fare back to the ol' home town.

The journey back to Schönmünzsch was exciting and strenuous. First to Geralsau, and up a splendid new motor road from 500 to 900 feet. Then a very steep descent over a narrow, country road down the thickly wooded Bühlerthal.

There is no doubt that, during our wanderings, we neglected the contour factor. Constantly we found ourselves in places where a car had no business to be; where the coupé was, in fact, the only car. However, this used to entertain the natives and let us see places which we should never have visited had we been more orthodox and careful.

At the head of the Bühlerthal, and at a most awkward spot, we were faced suddenly with a "Strasse Gesperrt!" An arrow pointed to a track on the right, as steep as the side of a house. I swung the car round, changed into second and rushed it.

Over five and a half miles of abominable going we rose from 650 to 3,000 feet. The coupé behaved splendidly. When the top was reached the engine had more kick in it than I had. Georgina's comment was full of sense: "It is a wonderful view; but next time I come it will be in someone else's car."

"Strasse Gesperrt!" "Verboten" and "Bitte" are like "Safety First," "All right" and "Cheery-o!"—words which a foreigner simply cannot help learning; words which rise superior to all linguistic difficulties.

The famous "Verboten" is always used in connexion with something you would never dream of doing, such as walking on a highly-cultivated flower bed or entering a ladies' bathing tent.

"Bitte" is used in much the same way as the Army word "please"; that is, it is used on every possible and impossible occasion. Hence, it is correct to say:—

"Will you bitte render a return showing the number of unexpended tins of p. and a. jam held on charge, bitte. This is required for the information of the C.M.A., bitte."

"Gutenmorgen" is a tiresome expression because everybody greets you with it *every* time he or she meets you between the hours of 7 a.m. and noon. The same waiter will fire "Gutenmorgen" at you seven or eight times in one morning. At first I bore it with fortitude, then with resignation, and finally with a fixed, fatuous grin. Georgina began in a cheerful

manner: "They mean well, you know," she would say. Within a week her answering "Gutenmorgen" sounded like the snap of a strong lock, and shortly after that it was replaced by a hostile glare. I had to speak to her seriously about it, but she never regained her light-hearted, "They mean well, you know" outlook in face of these two little wearing words.

Hundseck consists of a mountain top, pine forests and a hotel. The latter advertises its fresh-air-altitude Kur. No better place could be imagined for a sanatorium or a Boy Scouts' Jamboree.

After a long, easy descent over a rough road, through Aschenplatz and Rauenmünzsch, we got back to Schönmünzsch at nightfall: a run of fifty miles.

On Sunday morning the hotel was invaded by twenty-one fat, ruddy men, who descended on us in three motor cars, and whose thirsts were remarkable.

Georgina and I beat a retreat.

We climbed the hillside facing the hotel. It was a clear, still morning, and we could hear distinctly every sound made in the valley below.

Presently there was a great hubbub. From a clearing in the trees we saw the twenty-one fat men leaving the hotel and lining up beside their cars. Suddenly a silence, and then some part-singing which could not be equalled outside Wales. The effect of the sound, mounting to us through the trees, was beautiful.

That over, the fat men gave the German equivalent for three rousing cheers, and departed.

In this impromptu concert the choir was composed of the members of the Mannheim Butchers' Society.

Wayside music is specially associated with bummblers.

According to the dictionary, a bumbler is a "lounger or loiterer."

Whether singly, in pairs, or in dozens, bummblers are in constant, robust, purposeful movement. They stride along the roads, through the forests and over the hills: they swarm on the battlements and penetrate the dungeons: they fill the museums, galleries and inns; and everything they do is redolent of energy and force. A couple of students, a school, or a bummblers' club, they can always be recognized: hatless, tanned skins, guide books, maps and big rucksacks. Even the women and girls carry these heavy packs.

When they number a dozen, or more, they march in military formation with a band and banners at the head. Picturesque quasi-uniform, with plenty of contrasting colour, is common.

The band consists of violins, mandolins, guitars, etc. Folk-songs are favoured. The instrumentalists strike up a merry marching tune: in a few seconds every bumbler is singing lustily and in harmony. When a big uniformed company is swinging along a forest road to the strains of a martial chorus, the sight and sound are inspiring.

At this time horse flies were a perfect plague, especially in the lower,

warmer valleys. Horses were tormented ; they were viciously bitten and trickles of blood ran down their necks, flanks and limbs : a distressing sight. Occasionally the more nervous animals became so restive that they were difficult to control. Georgina was bitten on the hand by one of these insects. The hand became very inflamed and painful, and wet dressings and a sling had to be worn for several days.

This is a Roman Catholic country, and there is a Calvary—sometimes two—at every corner and cross-roads, and on every hill-top, and wherever Nature or man has marked the landscape with any kind of feature.

These Calvaries seem to be made on the mass-production system. Hundreds of the same type may be seen in one area and, in an adjoining area, hundreds of quite a different type. The manufacturers seem to have combined to divide the country into supply-preserves.

It is curious that we never once saw a man uncover, or a woman curtsy, before a Calvary. No sign of the cross, no praying. The peasants passed by apparently unconcerned and unmoved.

The cottage gardens are bright with flowers and shrubs, but the effect is marred by dozens of metallic glass balls which are painted in every hue of the rainbow, like the balls used for decorating Christmas trees. They are planted on sticks ; some of the gardens were thick with them ; they may serve some utilitarian purpose, but they are not artistic.

On July 19 we started due south and stopped for a little while in Freudenstadt, a beautiful old town. Thence to Reinerzau, where we lost our way and ran into a farm yard. An old lady, aged about 100, set us right. She was greatly interested in the coupé and astonished beyond words at Georgina's temerity at the wheel. Probably she had not been out of the farm precincts for many years, and cars were scarce in those parts.

Through Wolfach and Hornberg we wound and switchbacked over good surfaces and amidst varied mountain scenery. The Gutach Valley was entrancing. Then a long steady climb which culminated in bleak hill scenery reminiscent of the Scottish Highlands. A descent to an exposed plateau followed. This illustrates our ups and downs :—

Freudenstadt	2,050 feet	} 12 miles
Hornberg ..	..	..	1,190 "
Sommerau ..	..	..	2,570 "
St. Georgen	2,490 "	} 10 miles
Villingen ..	..	..	2,180 "

At St. Georgen all the inhabitants were paraded in the main street, forming up for a wedding procession. Some of the men and women were in mountain peasants' gala dress. The majority were modern, and the display of men's frockcoats and tall silk hats was wonderful to behold.

German styles in frock coats and silk hats are worth studying. Many of these articles of gents' wear must date back to 1870, or earlier ; and the earlier they are the more is their owners' prestige augmented.

Villingen is surrounded by an ancient wall pierced by fine gateways, and contains some picturesque old buildings.

While the tank was being filled the usual knot of interested onlookers gathered and, in due course, the usual question was asked: "When will your Government allow us to enter England again and work there?"

Since the war Germany's trade, industry and commerce have made enormous strides. No doubt this is due in part to organization, enterprise and push; but it is also due to long hours and low wages. The day is still far distant when Fritz will work under the same conditions as labour enjoys in England; and the British worker would revolt sooner than submit to the hours and wages in force in Germany.

Then again, there are no trades union restrictions worth mentioning in Germany. When Fritz works, he works exceedingly hard. He has to, for, if he does not, there are a hundred on the spot ready and willing to replace him.

As the coupé approached Donaueschingen, the sky to the south-east presented a most ominous appearance. A great bank of black clouds, with yellow borders, lay low on the horizon. The air was deadly still and the atmosphere sultry to a degree. An occasional big drop of rain splashed on the bonnet; the reflection of lightning swept across the sky and the distant growl of thunder could be heard above the throb of the engine.

At mile 76 we found shelter in a misappropriated chateau which, having fallen on evil days, now forms part of the hotel. With its park and gardens it must have been a fine property at one time.

Donaueschingen has an air of decayed gentility. Great folk have stayed there with their councillors, clerks and servants. They have held their courts, gossiped in their salons and taken the air in the formal well-tended gardens.

Gallants, guardsmen and grooms have walked or ridden through the streets while the burgesses cowered or cheered as circumstances dictated.

No doubt the spirit, if not all the forms, of feudalism survived here for a long time: possibly until that fatal November of 1918.

Now the aristocratic-looking Baroque edifices are either empty, or divided up for the use of humbler people. The ornate tables are swept and garnished, but the hundred stalls are vacant. The gardens are trim and formal as ever, but only the birds and bees dwell therein.

Nothing but the shell of nobility remains and yet—the shell continues to retain its grace, even in decay.

The most imposing building is the Palace of the House of Fürstenberg.

Behind the palace is a splendid riding-school, and farther up the street is a row of buildings in which are stored the records, etc., of the princes of Fürstenberg. From basement to roof they are crammed with documents.

Donaueschingen is the birthplace of the Danube.

Imagine a tiny little stream issuing from beneath a moss-covered rock and shyly pushing aside the bracken and the wild rose.

Think of its eastward course, gradually increasing in length, breadth, depth and volume, until it becomes the mighty river whose fame is renowned in song and story.

Well—it is pleasant to imagine all this ; but the reality is quite different.

“Where is the Donauquelle, bitte?”

“It is there at your feet, bitte.”

You look, and you see an enclosure near the palace gardens. It is a place formed of concentric circles.

The outermost circle is a broad bed of scarlet geraniums bordered by closely cropped grass. Within this is a strip of gravel and then a smooth, flagged pathway. The latter is, in turn, bounded by a sculptured stone balustrade which rings a masonry basin. The basin is about thirty feet in diameter ; it contains crystal-clear water and is fed by a spring.

This spring is the source of the Danube. An engraved plaque tells you so, and the members of a group of statuary draw your attention to the plaque. You are left in no doubt whatever, and imagination reels.

A good example of Kultur !

At 10 p.m. there was a sudden flash of lightning, followed immediately by a terrific thunder-clap. A few minutes' silence and then a rapidly increasing roar which culminated in a hurricane. The wind struck the house with incredible violence and swiftness : doors and windows banged, panes of glass were shattered, slates and chimney-pots flew through the air and were smashed on the ground. Great branches of trees bent, cracked and snapped off, and the din was alarming.

In about three minutes all was over and, except for the excited cries of the servants and the wailing of children, silence again reigned and continued unbroken for the rest of the night.

Next morning we ran across a belt of country which had been swept by the hurricane.

This belt was five miles broad, and its margins were quite clearly defined.

Within the damaged strip all the telegraph poles, most of the trees and nearly all the fences were down. In the villages windows were broken and dozens of roofs torn off.

We saw a small, two-storied factory which had been erected recently. The force of the wind had caused the upper storey to slide along the lower : the perpendiculars of the former were about twelve inches out of alignment with the perpendiculars of the latter.

Little knots of people were everywhere—inspecting the damage discussing their losses and beginning the work of repair.

We passed numerous road gangs, composed mostly of foresters. They must have started operations bright and early, for already a large amount of clearing work had been done. The fairway was very narrow at those spots where the fallen trees had been moved aside but not yet dragged away. Still, the whole road was open except at one point where a stricken

giant was entangled with telegraph poles, wires and fencing, and lay half-embedded in a marsh beside the road.

At this barrier the crowd included the passengers of several cars, beer lorry drivers and a party of tourists travelling by char-à-banc. Among the latter was a merry widow from the Argentine who whiled away the hour by recounting to us her experiences in, and impressions of, Germany. Her discourse was broken frequently by appeals to her little boy who persisted in wading in the marsh, or standing in dangerous proximity to the fallen tree. He was not an obedient lad.

"A wedding procession—ah! si, si—in Freudenstadt. (Carlos! come away immediate: zee beeg branch fall on your head.) Zee bride and bridegroom in front? But no; not so: not altogether: for in front of them is a leetle, leetle boy. (Carlos! your feet—they get ver' wet.) Zee bride . . . I say: 'Ah! No flowerrs? No orange blossoms? W'y no orange blossoms? (Carlos! you are ver' naughty boy.) An' they say: 'You see leetle boy? Well—zat ees zee leetle boy of zee bride: what for wanting orange blossoms?' Ver' funny!" and the señora laughed merrily.

So did we.

At last the road gang got a couple of big, powerful forestry jacks under the prostrate trunk, which was prised up high enough to allow the coupé and a small German car to squeeze under.

A good road took us through forests, then vineyards and finally pastoral country, via Gersingen, Möbringen and Tuttlingen towards Lake Constance.

At Tuttlingen there is a statue of Max Schneckburger, the author of "The Watch on the Rhine." The town is 2,310 feet, and Lake Constance 1,210 feet above sea level.

Just before reaching the lake you pass through Stockach, perched on the very edge of a steep plateau. It is a pretty little Kur place: clean, airy and picturesque. From here there is a fine view of the distant, snow-clad mountains of Switzerland.

Lake Constance.—The guide-books will tell you that the Bodensee—Lake Konstanz—is forty miles long, nine miles broad and 770 feet deep. That its northern end is divided into the Überlinger See, the Zeller See and the Unter See. That in the Middle Ages it was called the Schwabian Sea. That it is bounded on the north and east by Germany, on the south by Austria and on the west by Switzerland.

All very interesting, no doubt, but somewhat unsatisfying.

However, when you read further that the See and its shores are a dream of greens and blues: that its waters are extremely rich in fish: that its aquatic sports are exceptional and its facilities for yachting superb, you say: "Let us investigate; perhaps it is not altogether dull."

We did not find that Lake Constance is 770 feet deep; but we did find quite a lot of nice things which the guide-books never even mentioned.

The road running south-east has a good surface, and hugs the water's edge most of the way.

Passing through Überlingen, we arrived at Meersburg.

Meersburg consists of one straight street which occupies a narrow strip of shore at the foot of a bold, rocky headland. On the latter stands a big castle which seems to overhang the town.

Some day Meersburg will be drowned, or crushed to death.

The one street contains a number of little old houses. Each has been freshly painted and each house owner has chosen a different colour. Flags, banners and pennants float from a hundred poles, or are strung across the street. The whole scene resembles Old London as depicted in a Dick Whittington pantomime at Drury Lane.

This stage effect is enhanced by the position and character of the schloss: a huge pile of buildings pieced together in haphazard fashion and flanked by a great tower with a curiously shaped roof: a good example of a mediæval German fortress-residence.

We reached Friedrichshaven after covering sixty-six miles.

Friedrichshaven is an important lakeland Kur town. Kultur is represented by the adjoining Zeppelin factory and hangars. There is the usual "palatial hotel replete with every modern comfort and convenience." We followed our rule of doing as Fritz does, i.e., we avoided the palatial hotel, and put up at a more modest and less costly place.

The landlord was most attentive (but they all are!) and spoke English. Judging from his habitual attention stance, and his constant "major" this and "major" that, we guessed him to be an ex-warrant officer and probably an ex-P.O.W.

Good English is spoken by many Germans—but not by as many as one expects. This is accounted for by migration restrictions and by decline in the British tourist traffic. On the other hand there is an increase in the number of Germans who speak American.

The food at this hotel was even better than the average—high praise—and meals were served piping hot. Naturally, one prefers home cookery but, apart from native prejudice, there is only one complaint to be made about the food in these little German hotels: the supply exceeded our demands.

If you order, say, fried ham and eggs, you are given a plate of four eggs in which is embedded a large quantity of ham. Or ask for bread and cheese; you are presented with enough bread, butter, cheese and pumpernickel to satisfy six ordinary Englishmen. Or demand trout; four to six trout, and a big dish of boiled potatoes are produced.

At the end of a long day in the open, Georgina and I usually managed to dispose of a fair proportion of any one dish; and the lager was a great help. But the proteid items were formidable obstacles. John Bull and his roast beef? Why, the modern John Bull is but a babe compared with Fritz. True, the latter is not keen on roast beef; but his capacity and endurance when face to face with a mountain of "calf's flesh," or "swine's flesh," fills one with amazement, if not admiration.

I have never seen him defeated—not even by one small scrap.

In the later stages of the War Germany suffered from a shortage of food. In this connexion “suffered” is the right word.

The schloss of the Hertzog of Württemberg, with its big church and beautiful gardens, and the Zeppelin museum, are worth seeing.

Also, do not fail to visit the Reichsbüro in Friedrichshaven. This Government office is run by a young fellow who is most patient, painstaking and helpful. For an hour we discussed with him our tour. He produced books and maps, gave us useful advice, and seemed just as interested in the subject as we were. A good example of efficient, up-to-date advertising. I hope that nice young man will receive accelerated promotion.

Fifteen miles south of Friedrichshaven is Lindau, close to the Austrian frontier.

It is built on an island, to which access is gained by road and rail bridges.

We visited the town on July 21, and found it very quaint and altogether charming; of all places on Lake Constance, the best.

The harbour entrance is guarded by a great stone lion who shows his contempt for the ancient town by turning his back on it. The inhabitants point to this modern masterpiece as *the* attraction of Lindau—but it is not.

As the weather was fine, Georgina overcame her horror of the sea and ships and all that pertains to them; we embarked for Constance.

Unlike Lindau, Constance is much advertised. We agree that it is “the chief centre of tourism on the lake,” but we could not see in it “an ancient town of great historic charm.”

It is full of shops which sell painted shells and chrystoleums; the shops are full of sausage-laden trippers and the whole place bears the mark of the seaside landlady.

We caught the first boat back.

On the return trip we passed the island of Minau—“The Isola Bella of the Bodensee”! The Duke of Baden has a family residence here.

Georgina came down to dinner in a depressed frame of mind—the result of her sea voyage to Margate, no doubt. An extra glass of München Hell banished the ailment.

(To be continued.)

Echoes of the Past

A VOYAGE TO BOMBAY.

BY LIEUTENANT-COLONEL G. H. YOUNGE, F.R.C.S.I.

Royal Army Medical Corps (retired).

THERE are many thousands of people throughout the Empire who have accomplished the journey which gives a title to my paper, and no doubt a large proportion of them have at one time or another written descriptions of it—for publication or otherwise. The subject therefore may well be looked upon as threadbare. And yet it possesses such perennial interest for so many members of the British Empire that I venture to undertake a fresh description of it.

During my active service days it was kismet that I should do the journey between the United Kingdom and Bombay on six occasions. When I look back upon those journeys, nowadays, I feel a strong conviction that we always left England in a heavy snowstorm. It seems scarcely possible that this impression can be correct and yet it persists and becomes intensified as the years roll by. Also, when I meditate on those journeys, as I often do, I think first, if not exclusively, of the original one, which began in November, 1882, no doubt because it has left the most vivid impressions.

On that occasion we left Portsmouth in the dear old Indian troopship "Jumna" on November 18, 1882 in the midst of a fierce snowstorm. At that time four Indian troopships were maintained by Government and were manned by officers and men of the Royal Navy. They were huge unwieldy structures, which towered high out of the water, rolled horribly even in a moderate sea and whose average speed was something less than twelve knots an hour.

As we left the harbour a storm signal was hoisted on shore and we ran down the Channel in a high sea. The Bay of Biscay was true to its reputation, as the weather we encountered there was described by the Captain as the worst he had seen for many years. At the height of the gale, the wife of one of the gunners on board presented her husband with a handsome and vigorous baby boy. He was baptized some days later, the wife of the Officer Commanding the troops on board acting as his godmother. I have never forgotten the Christian names she chose for him, namely, Charles Jumna, and have often wondered what was the ultimate fate of an infant who arrived under such unusual circumstances and who excited such vivid interest amongst all on board.

We were not done with exciting incidents in "The Bay," however. The morning following the arrival of our new passenger, a sailor, whilst fixing a patent lifebuoy at the stern of the ship, fell overboard. It seemed impossible that the man could be saved in such a terrific sea, but in an

incredibly short time a party of bluejackets had lowered the lifeboat and were pulling for dear life in the direction of the man. To the many anxious eyes watching it from the troopship, the lifeboat seemed at one moment to be raised on a mountainous billow and at the next to be plunged into a bottomless abyss. After an hour of almost superhuman exertion it reached and picked up the man. During the time he had been in the water he calmly kept himself afloat without making any attempt to swim in the direction of the troopship and probably owed his life in a great measure to this self restraint. As the lifeboat approached the "Jumna" a huge wave hurled it against the troopship completely stoving in one of its sides. Eventually it was got on board, however, and the occupants were found to be quite uninjured and none the worse for their exertions. The rescued man ran down to his berth, changed his uniform and was back again on deck within half an hour to answer his name at roll-call.

Gibraltar was reached early on Sunday morning, so that some at least of the passengers were able to attend service in one of the Garrison churches. "The Rock," as it is affectionately known to those who have served there, is an isolated mass of calcareous rock which rises 1,408 feet above the sea level and is one of those sights which must always thrill the heart. Apart from its size, its position and its vast military importance it is much less imposing than one might imagine, however. The two towns, north and south, are rather poor, not to say mean, in appearance. The real interest centres in the fortifications, which are, of course, closed to all except specially privileged visitors. It may, however, be said that every spot from which a gun can be brought to bear is occupied by cannon. To those who are permitted to see them the fortifications are marvels of engineering.

The casual visitor, however, can find plenty of interest for a day. There are the Governor's residence, the barracks, the two towns, the ruins of the Moorish Castle, the dockyards, and, above all, the Alameda Gardens to be seen.

Having taken on board artillery drafts for Malta and Egypt we sailed again at sunset. The following morning we woke up to find a dead calm with the sea like glass, whilst the ship was bathed in brilliant sunshine. After the biting cold and the fierce storm we had lately passed through the change was truly delightful. The warmth and sunshine quickly revived the dormant energies of the junior officers. They heralded their return to full vigour by various pranks, amongst others by scrambling up the riggings. The bluejackets promptly captured the acrobats, with the result that the latter had "to pay their footing." Nautical custom had fixed this at a bottle of whisky for each captured officer. Unfortunately four of these found their way into one mess, with the result that the Captain's wrath fell on both the officers and their captors!

As we steamed eastward the temperature rose steadily. The unclouded sky, the brilliant sunshine and the deep ultramarine of the sea were in themselves sources of sheer delight. On board ship every object besides

sky and sea is a source of interest. A passing ship or a school of dolphins, for instance, will draw crowds to watch them. Indeed, in a rough sea, no prettier sight can be imagined than a school of dolphins racing alongside and leaping from wave to wave. There was no band on board, unfortunately, as the troops consisted entirely of drafts going out to join their regiments. We had, of course, the usual deck games, the favourites being quoits and cricket. The evenings were devoted to whist, to the usual promenades on deck and to music, but the musical talent was not of a high order. One of the naval officers propounded a conundrum, which occupied and puzzled the passengers for days. As all know, at sea the day (of twenty-four hours) is divided into a series of watches. Two of these are of half the usual length and are technically known as "Dog-watches." The conundrum was, "Why are these called 'Dog-watches?'" and the correct answer, "Because they are *cur*-tailed."

We reached Malta at 6 a.m. on November 27, and did not leave again until midnight, so that we were able to spend a long and interesting day on shore, and those who spent it in sight-seeing were amply repaid for their exertions. The island is situated on a submarine plateau, which extends from Sicily to the African coast. It is slightly over seventeen miles in length by nine miles in breadth. The south coast consists mainly of steep, rugged cliffs, which act as an ample defence in that direction. The north coast is much less precipitous, and is broken by numerous bays, which are separated from one another by long peninsulas. The island is of late Eocene formation, and to a casual observer appears to be almost wholly composed of drab-coloured limestone. The soil is light, but very fertile, so that two, or even three, crops are produced annually. The surface of the island is diversified by long undulating hills, one or two of which rise to perhaps 800 feet above the sea level. These are separated by deep rolling valleys. The valleys and the terraced slopes of the hills are laid out in tiny fields and gardens, fenced with high stone walls, a feature which was calculated to delight the heart of an Irishman. At the time of our visit there was not a trace of grass to be seen, so that the glare from the drab-coloured soil and rocks was distinctly trying. The only apparent vegetation was some scattered patches of prickly pear. This might lead one to suppose that the scenery of the island is monotonous and unattractive. Nothing could be farther from the truth, however. The constant change of contour in the surface, the quaint villages dotted on the hill sides, the occasional patches of vegetation, and especially the striking contrast between the drab-coloured land and the deep blue of the sea made a picture of singular beauty.

Huge herds of goats were seen in every direction, an interesting fact in view of the researches on Malta fever, which have conferred such enormous benefits not only on the garrison and residents of Malta, but indirectly on the whole human race.

The climate of the island is delightful for the greater part of the year.

The temperature in winter varies from 55° to 60° F., and in summer from 80° to 85° F., or even higher. The sirocco winds, which prevail chiefly in September, are, however, very relaxing, as they come direct from the African deserts.

The history of Malta is replete with interest. It is, of course, impossible to enter on it fully here, but a few of the chief events may be indicated. The island was first colonized by the Phœnicians about 1000 B.C. Under them it rapidly became an important and wealthy commercial centre. During the Punic war it was the scene of many encounters and was surrendered to Rome in 218 B.C. Under the Romans it continued to prosper until A.D. 870, when it was captured by the Saracens, who appear to have held it for nearly three centuries. Subsequently it passed in succession to Normandy, to Germany and to Spain.

In the year 1530 Charles V of Spain granted the island to the Knights of St. John. On March 26, 1566, the first stone of Valetta was laid by Grandmaster La Valette, and the town with its fortifications was finished in five years. In 1798 Napoleon occupied and garrisoned Malta. Two years later its inhabitants appealed to Great Britain for protection, and the island finally passed to her in 1814.

As the "Jumna" glided into the harbour, Valetta was slowly revealed to us in all its beauty and grandeur. The harbour is, indeed, a magnificent one, stretching as it does for a mile and a half inland. It is subdivided by a long, narrow peninsula, the Grand Harbour lying to the east of this promontory, and the Marsa Muscetta or Quarantine Harbour to the west. The town and its suburbs, Florian and Sliema, are built on a steep ridge of rock, Mount Scaberras, which surrounds the harbour. On this ridge the streets run lengthwise and crosswise. They are paved with large rough cobble-stones, and are kept spotlessly clean. At the time of our visit the chief defect in the town was its lighting. Oil lamps, placed at long intervals, were solely used, and these served only to make the darkness more visible. The buildings on the lower parts of Mount Scaberras consist mainly of handsome, flat-roofed warehouses, magazines, an imposing Customs house and police barracks. On every side Valetta literally bristles with fortifications, which remain as enduring monuments to the military and engineering genius of the Knights of St. John. The entrance to the harbour is guarded by Fort St. Elmo, Fort Ricasoli and the Castle of St. Angelo. On the land side the town is surrounded by two and a half miles of fortifications. These are of immense strength, the walls being fully fifteen feet thick, whilst some of them have actually been hewn out of the solid rock. Outside the counterscarp are numerous outworks. It did not surprise us, therefore, to be told that Valetta was universally looked upon as absolutely impregnable.

To reach the town we had to climb many flights of steep stairs. On either side of these were fine, flat-roofed mansions of two or three storeys, which had been built by the various Commanderios. From each mansion

one or more balconies projected. These bore a close resemblance to enormous square boxes affixed to the walls, so that their appearance was scarcely artistic. As a whole, however, the effect of the quaint, old-world architecture was quite delightful. On reaching the town one was charmed by the number and beauty of the public buildings. Chief amongst these were the Church of St. John, the Governor's Palace, the new Opera House and the Auberges of the Knights.

The Church of St. John was built about the year 1576, by Grandmaster La Cassiera, and was enriched by each of his successors. Abutting on the right of the church is the former residence of the priors, and on the left that of their clergy. The exterior, therefore, looks more like that of a huge secular building than of a place of worship. The façade is somewhat heavy and decidedly less graceful than one would have expected. The interior of the church, however, more than compensates for the slight lack of beauty in the exterior. At the entrance to the sanctuary stand the famous silver rails and gate, quite ten feet high, which were saved during the French invasion by being covered with whitewash. The choir is ornamented by an exquisite piece of sculpture in white marble, which represents the baptism of Christ by St. John. The roof is semicircular, and is adorned by a series of lovely paintings after Preti, illustrating the life of the same Apostle.

The mosaic floor of the nave is composed of sepulchral slabs, the monuments of 650 knights, in purest, semitransparent, white marble. At the head of each monument is the coat of arms of the knight who sleeps beneath, and at the foot a panegyric to his memory. These are superbly inlaid, either in jasper, in agate, or in marble of the most exquisite colours. The grand altar stands at the upper part of the nave. It is a work of surpassing beauty in many coloured marble. On each side of the altar is a raised pavement on which stands a chair covered with a rich canopy of crimson velvet.

The chapels of the different languages of the Order run parallel to the nave, three on either side, and form the aisles. They communicate with the nave by magnificent archways. The roofs of the chapels are dome-shaped, and they and the archways are profusely decorated in alto-rilievo. Each chapel contains superb mausoleums to the Grandmasters of the language, and is profusely decorated with paintings illustrating the lives of Christ and of the Apostles. Unfortunately, however, many of the paintings are rapidly falling into decay.

The palace of the Governor in the Strada Reale, which was formerly the residence of the Grandmasters, is a plain but imposing structure. The interior is handsomely fitted up. The Council room contains some fine tapestry of French origin. In the armoury is a fine collection of weapons, armour and documents belonging to the period of the Knights of Malta, and also a series of portraits of the Grandmasters. There is also a fine library, which contains over 60,000 volumes.

A somewhat gruesome sight is the Catacomb, known as the Chapel of Bones. A good sized chapel, situated below the level of the ground, is hewn out of solid rock. The interior is decorated with the bones of 3,000 people, arranged in artistic patterns. A dado runs round the chapel formed of skulls placed eight deep. The idea seems somewhat ghastly, but the bones are arranged so artistically that they do not strike one in this way at all.

As the hour of sailing was uncertain, all officers were ordered to be on board by 5 p.m. This was disappointing, as it did away with any chance of visiting the Opera House. After we had returned on board, however, we were treated to a display of the most indescribable beauty. As the sun slowly sank, the western sky gradually changed to a brilliant orange-yellow; whilst from the horizon long, iridescent streamers, scintillating with every conceivable colour, shot up almost to the zenith. Scattered amidst these were tiny masses of cloud, which blazed with absolutely dazzling colours. As the sun, of fieriest red, and magnified to many times its normal size by vapour, came to within, apparently, some six feet of the horizon, it seemed suddenly to drop from the heavens and disappear as by magic. In a moment the eastern sky was suffused with the softest and loveliest radiance. A few minutes later a gloriously brilliant full moon sailed into view from behind the steep ground on which the town stands, throwing all the buildings to the east of the harbour, and especially a magnificent church with a noble spire, into the most perfect and wonderful relief. Innumerable boats, each lit up by Chinese lanterns, glided over the harbour, from many of which faint strains of weird and enchanting music could be heard; whilst from the Admiral's flagship the notes of a perfect band, mellowed by distance, reached us. It was, indeed, a night and scene of perfect beauty.

We reached Port Said at 5 p.m. on December 1. As the Indian troopships were not then fitted with search-lights, they were not permitted to travel through the canal at night time. We had, therefore, to remain at Port Said until 6 a.m. on the following morning. We were, however, allowed to spend the evening on shore. There are a number of handsome offices running parallel to the wharf, which belong chiefly to the shipping companies. When these are passed, however, the native part of the town is, or at least was at that date, anything but attractive. The houses were flat-roofed, generally of one storey, and were incredibly poor and shabby. The wares displayed in the shops were cheap and tawdry; whilst judging from what we saw and heard, the moral atmosphere was even worse, indeed, very much worse, than the physical. It was, therefore, a relief to all when we left our mooring and entered the canal.

It would, I imagine, be impossible for any European to enter the Suez Canal for the first time without having his feelings deeply stirred by thoughts of the genius, the labour, the colossal sums expended on its construction, and of what its completion meant to the civilization and commerce of the world.

History tells us that in past ages several canals, which connected the Nile Valley and the Red Sea, have been constructed, notably those of Rameses II and Darius I. The idea of connecting the Mediterranean and the Red Sea would appear to have originated with Napoleon, who commissioned an engineer named Lepère to report on the scheme. M. Lepère, however, came to the conclusion that the Red Sea was some thirty feet above the level of the Mediterranean, and that the scheme was, therefore, impracticable. In 1841, however, British officers proved that M. Lepère's opinion was erroneous, and acting on their surveys, M. de Lesseps again took up the idea in 1849, and as we know, carried it to a triumphant conclusion.

The canal is 100 miles in length, and varies in width from 60 yards, where the banks are high, to 110 yards where they are low. At no point do the banks exceed 50 feet above the sea level. The minimum depth in 1882 was 26 feet, but this has since been increased to 28 feet. The width of the canal does not admit of steamers passing one another when both are in motion. Locks are, therefore, placed at intervals of five miles. Ships returning from the east are given right of way, vessels outward bound being tied up so that those homeward bound may pass quickly through the canal. The fates seemed to decree that the dear old "Jumna" should be moored in almost every section of the canal. Our progress was, therefore, of the slowest—indeed very much under five miles an hour. Nor was there much to enliven the monotony of the journey. To westward we saw, in the shallow waters of Lake Menzaleh, huge flocks of flamingos. When at rest these were of a rich creamy white colour, but when they rose, and showed the under surface of their wings and body, they were of a lovely deep pink. When numbers of them rose together, they seemed to form a brilliant pink cloud. Now and then camps of wandering Arabs were passed, the children from which ran along the banks begging for coppers.

Several perfect examples of mirage were seen to the east. At one point a lovely island appeared, the slopes of which were beautifully wooded, whilst the sea rippled gently on its shores. It seemed incredible that the ground was a perfectly level, barren sand, with only an occasional stunted bush or tuft of grass on it, yet such was the case.

It was a pleasure to enter the Bitter Lakes, where a fair speed was again possible. We halted for some time opposite Ismailia to send mails on shore. The town, surrounded by lovely trees and palms, amidst which handsome buildings are scattered, is a spot of beauty in the midst of a sandy desert. Even in the Bitter Lakes, however, our bad luck did not desert us, for, whilst waiting, the "Jumna" drifted on to a sand bank, from which it took several hours to refloat her.

As the result of repeated delays we did not reach Suez until the afternoon of December 4. We only halted there sufficiently long to get our letters and to unship some stores which we had brought out for the

gunboat. Seen from the troopship the town appeared a fine one, but the ground on which it stood seemed to be raised but a foot or two above the waters of the Gulf. The surrounding view was, however, grandly impressive. The rugged, deeply violet heights of Gebel Ataka ran parallel to the Gulf on the west; whilst to the south-east were seen the hills amongst which Mount Sinai stands. At the foot of the latter an oasis of tamarisk and palm trees was seen, the only patch of green along the shores of the Red Sea which is believed to mark the site of Moses' well.

Short as our stay at Suez was, it sufficed for some of the officers to produce a quantity of gigantic tackle, baited with joints of pork, with which they proceeded to fish for sharks. Unfortunately, for some reason, the screw was suddenly and unexpectedly set in motion, the tackle was fouled, and so the experiment ended abruptly before any of the intended victims had put in an appearance.

The voyage through the Red Sea is always monotonous, and very frequently decidedly uncomfortable as well. A fierce sun blazing overhead, an atmosphere saturated with moisture, and a temperature of from 85° to 90° F. in the shade, are not as a rule conducive to enjoyment. When to these are added a stern wind, the voyage very much resembles a five days' continuous residence in a Turkish bath. Nor is there anything to compensate for these decided disadvantages.

One occasionally catches glimpses of barren red-brown cliffs from whose colour the sea, no doubt, received its name. We were exceptionally fortunate, however, as we had a cool, refreshing head wind all the way, so that we did the journey in comparative comfort.

On Wednesday, December 6, we witnessed the Transit of Venus and watched the phenomenon with intense interest as the Navigating Lieutenant informed us that it would not recur for at least a century. It became visible about 5 p.m. When seen through smoked glasses, it appeared as a black spot on the sun's disc nearly as large as a billiard ball.

On December 7 we had athletic sports on board, which were well arranged and well contested. The obstacle race was highly amusing, and was quite the event of the day. The competitors had first to crawl through barrels placed sideways on the deck, in which small paper bags filled with flour were suspended; then through life-buoys hanging some six feet above the deck. The course then passed down a companion ladder, on which several fire-hoses were playing at high pressure, and finally through a series of sails filled with salt water.

Shortly after daybreak, on December 8, we passed the "Deadly Brothers"—two huge masses of rock which rise almost perpendicularly from the sea. A dangerous shoal runs from the mainland to within a short distance of these, the rocks and shoal being separated by a deep, narrow channel. By taking this channel a vessel saves some thirty miles, but the short cut is so dangerous that it is only attempted during daylight and in calm weather. To a landsman on his first long sea voyage the passage

was distinctly thrilling. Reaching deck about 6 a.m. I found the "Jumna" heading straight towards the centre of a precipitous rock which towered from the water. On we went at full speed until it seemed that the ship must inevitably dash into the very centre of the rock. Suddenly the helm was put hard round, the dear old "Jumna" turned at right angles to her previous course and dashed into the channel. As she passed through it we saw a steamer which had run on the reef a day or two earlier from which the passengers and cargo were being unloaded. A little further on the remains of two earlier wrecks were still visible.

On the afternoon of December 9 we passed close to Aden. The peninsula is composed of a mass of volcanic rocks, five miles in length, which are joined to the mainland by a level, sandy isthmus. To the west the rocks are almost perpendicular and rise to a height of 1,776 feet above the sea level. The rain of ages has worn the upper surface into sharp points and scored the perpendicular sides with innumerable deep fissures. From a little distance the effect is grandly impressive, giving the impression of vast columns and pillars crowned with pointed towers. The town is on the eastern side of the peninsula and occupies the crater of an extinct volcano. Seen from the "Jumna" it appeared to be a bustling, prosperous seaport, but its position and aspect must make the climate appallingly hot and relaxing.

Between Aden and Bombay there was little to break the monotony of the voyage. At frequent intervals swarms of flying fish rose in front of the bows and flew forwards for from fifty to perhaps 200 yards. These flights were a source of perennial interest to those of the passengers who were on their first voyage to the East. More than once we passed through vast swarms of jelly fish, extending for many miles, some of which were of enormous size and lovely colouring. As they floated on the surface with their brilliant, many coloured, transparent tendrils projecting downwards they were objects of striking beauty.

As we neared Bombay we caught sight of occasional specimens of the famous catamaran surf boats. They are made very deep and narrow so that the occupants can only sit one behind the other. Two curved arms, apparently fashioned from curved branches of trees, eight to ten feet in length, project at right angles from the starboard side. Lashed to the free end of these is either a large piece of log or a small air-tight barrel. Owing to the leverage of the arms the boat cannot capsize to the port side, whilst owing to the contact of the barrels with the water it cannot do so to the starboard. Catamarans can, therefore, pass safely through the worst surf or the roughest sea. With a favourable wind they can also sail at considerable speed.

We reached Bombay at 6 a.m. on December 16, 1882, and said good-bye to the dear old "Jumna" with feelings of much regret.

Current Literature.

Reduction in the Incidence of Malaria Among Residents of Canal Zone Towns and the Cities of Panama and Colon.—The statistics just released by Colonel W. P. Chamberlain, Chief Health Officer of the Panama Canal, show that the Health Department has met with unprecedented success in its efforts to control malaria during the calendar year 1927.

Sanitary regulations in the Canal Zone and the cities of Panama and Colon require that all cases of malaria be reported by the attending physician to the Chief Health Officer. Each such report is at once carefully investigated by the Health Department with a view to confirming the diagnosis, if necessary, and determining the locality where the disease was probably contracted. The figures are analysed each week and tabulated, the cases being charged to the places where infection is considered to have occurred.

TABLE I.—CASES OF MALARIA REPORTED TO THE HEALTH DEPARTMENT AMONG EMPLOYEES OF THE PANAMA CANAL AND THE PANAMA RAILROAD.

Calendar year	Average force strength	Cases			Rate per 1,000
		White	Black	Total	
1905	16,511	..	..	8,483	514.0
1906	26,547	5,134	16,659	21,793	820.9
1907	39,238	7,973	8,682	16,655	424.5
1908	43,890	6,352	6,020	12,372	281.9
1909	47,167	4,347	5,822	10,169	215.6
1910	50,802	4,884	4,603	9,487	186.7
1911	48,876	4,175	4,812	8,987	183.9
1912	50,893	2,746	2,877	5,623	110.5
1913	56,654	1,477	2,807	4,284	75.6
1914	44,329	950	2,664	3,614	81.5
1915	34,785	606	1,175	1,781	51.2
1916	33,176	180	367	547	16.5
1917	32,589	127	346	473	14.5
1918	25,520	64	410	474	18.6
1919	24,204	103	649	752	31.1
1920	20,673	85	316	401	19.4
1921	14,389	70	144	214	14.9
1922	10,447	56	120	176	16.9
1923	10,976	57	155	212	19.3
1924	11,625	55	135	190	16.3
1925	12,180	84	246	330	27.1
		177	119	196	16.1
1926	12,732	58	121	179	14.1
1927	13,560	38	107	145	10.7

NOTE.—Number of cases from 1905 to 1913, inclusive, are those *admitted to hospital only*. Those shown in 1914, and since, are *all* cases, whether or not admitted to hospital.

¹ Excluding Bruja Point, where a gang of workmen (nominally Canal employees) was installing large guns for the Army in 1925. Over half these men acquired malaria in five months. Since then the area has been sanitated by the Army and very few cases occurred among these workmen in 1926 and 1927.

Statistics for employees of the Panama Canal and the Panama Railroad are naturally the most accurate and complete which are received by the Health Department, because any illness which prevents a man from doing a full day's work is sure to be recorded and can be completely investigated. The following table shows the remarkable reduction in malaria among employees which has been effected since 1904, when the United States took over construction work from the French company.

Investigation showed that twenty-one of the thirty-eight cases of malaria during the year 1927 undoubtedly obtained their infections while outside of the sanitated towns. Probably a complete knowledge of all the facts would show that some of the other seventeen cases should also have been charged to unsanitated areas. These figures indicate *how little risk there is of contracting malaria when living in the protected towns provided visits are not made to outlying regions after sunset.* The protected towns are Colon, Cristobal, Mount Hope, Gatun, Paraiso, Pedro Miguel, Red Tank, Corozal, Ancon, Balboa, La Boca and Panama City.

The following table gives striking evidence of the progressive improvements in sanitation during the last five years:—

TABLE II.—CASES OF MALARIA (EMPLOYEES, NON-EMPLOYEES, MILITARY AND NAVAL) REPORTED TO THE HEALTH DEPARTMENT AND CHARGED TO THE SPECIFIED SANITATED AREAS.

Sanitated areas	Calendar year				
	1923	1924	1925	1926	1927
Fort Amador—Balboa—La Boca—Ancon —Panama City	123	118	133	98	82
Corozal—Fort Clayton	155	117	121	103	80
Pedro Miguel—Red Tank—Paraiso ..	65	50	19	30	22
Totals for Pacific side sanitated areas	343	285	273	231	184
Gatun—Fort Davis	169	158	155	184	90
Cristobal - Colon—Mount Hope	96	100	61	100	51
Fort Randolph—France Field—Coco Solo	258	158	154	168	85
Fort Sherman	147	172	157	115	62
Totals for Atlantic side sanitated areas	670	588	527	567	288
Grand Totals	1,013	873	800	798	472

Every case of malaria was charged to the sanitated area in which the patient lived unless the Health Department found clear indications that infection took place outside the sanitated areas. It is believed that many cases in Table II which are charged to sanitated areas were actually infected outside, the fact of exposure being either forgotten or wilfully concealed by the patient.

The progressive reduction in the incidence of malaria within the sanitated towns, as shown by Table II and other statistics, is believed to have resulted mainly from consistent extensions and improvements of the anti-mosquito drainage systems. This kind of work has been prosecuted

very intensively during the last three years by the Health Department of the Panama Canal. Material benefit has also resulted in recent years from the extensions and improvements of antimosquito sanitation in and about the military stations, this task being carried out under the auspices of the Medical Department of the United States Army.

In the employed force, ranging between 10,500 and 13,500, there have been but *two deaths from malaria during the last seven years*; these were in 1924, one being a white man and the other a black. Both men worked at night, engaged in dredging operations beyond the sanitized areas.

Reviews.

THE EAR, NOSE AND THROAT IN GENERAL PRACTICE. By D. A. Crow, M.B., Ch.B.Edin. London: Humphrey Milford. 1927. Pp. x + 150. Price 10s. 6d.

An excellent book in every way and one which would be a profitable addition to the library of every practitioner. The manner in which it is written is an object lesson to those all too numerous authors who emphasize matter of no great moment instead of laying supreme stress upon important everyday problems.

The author very rightly emphasizes in no uncertain fashion the superlative importance of the early performance of a myringotomy on cases of otitis media with retention in the tympanum. It is no exaggeration to state that an early myringotomy in a case of otitis media is as important as an early appendicectomy is in a case of appendicitis. In these enlightened days a practitioner would consider himself deserving of censure if he allowed a case of appendicitis to remain undiagnosed and untreated before the onset of general peritonitis, yet too often the same practitioner would feel no qualms of professional conscience if in a known case of otitis media under his care he permitted the drum to perforate.

Given a little practice, with the aid of an electric auriscope as suggested by the author, a practitioner would soon become sufficiently proficient to diagnose those aural conditions which urgently demand the performance of a myringotomy and either perform the operation himself, or send the case to a specialist.

Since otitis media is one of the commonest complications of the exanthemata it is very important that all doctors in medical charge of fever cases should have sufficient aural training to enable them to recognize and treat aural cases in the *pre-perforation stage*.

The dire results of omitting to perform this simple operation are amply and graphically shown in this book. It is possible that the forceful and dogmatic statements of the author will bring about adverse criticism in some quarters.

The author, however, is correct in considering the problem of the deaf to be one of the gravest problems of the day, and is to be congratulated in the part he has taken in placing in the hands of all practitioners the means for its prevention.

URINARY SURGERY. By William Knox Irwin, M.D., F.R.C.S.E. London: Baillière, Tindall and Cox. 1927. Pp. viii + 271. Price 10s. 6d.

The treatment of diseases of the urinary system is a subject of great importance to the medical practitioner, for these cases often call for very careful investigation, before they can be correctly diagnosed and treated.

Many of the diseases in this region of the body are insidious in onset, and the true character of a disorder may be overlooked, unless the medical adviser is able to appreciate fully the significance of the various symptoms and signs.

This small volume is intended by the author to be a guide for medical practitioners who treat these cases in the first instance. The subject is, however, so well dealt with in a condensed form, that the general surgeon wishing to refresh his memory on this special branch of surgery will find the book very useful.

The first part of the volume is devoted to an outline of the anatomy of the urinary system, as the surgeon must be thoroughly familiar with these details before pathological abnormalities can be recognized and properly understood. Various congenital deformities and malformations are appropriately dealt with, concurrently with the normal anatomy of the part.

The second chapter is devoted to the examination of the patient, and this subject is very fully treated. A sound systematic method of investigation is recommended, and the detailed plan presented will serve as a most useful guide to anyone examining a urinary case.

Each of the various parts of the urinary system is taken in detail and the practical use of such instruments as the urethroscope, bougies, cystoscope and ureteric catheters is described in a clear and simple way. This chapter will appeal chiefly to those who may not have had much experience in the use of these methods of investigation and require chiefly clear and simple directions without unnecessary details.

Following the examination of the patient the author takes certain prominent physical signs and symptoms, which are frequently met with such as: Incontinence of urine, frequent micturition, difficult micturition, retention of urine, urological pain, hæmaturia, pyuria, and deals with them in detail.

The various causes of these symptoms and signs are considered, and the necessary steps which should be taken in each case to establish the diagnosis are pointed out.

A special chapter is devoted to diseases of the prostate gland, and the various causes of enlargement of this organ, together with the corresponding

treatments. The present position of radium and X-rays, in the treatment of carcinoma of the prostate, will be noted with interest by anyone having the treatment of these cases in his charge.

Chapters XI to XIV contain good descriptions of all the standard operations on the urinary organs, and, considering the small size of the book, are remarkably full in descriptive detail for each operation.

The after treatment of operation cases is well described, and should be invaluable to any medical man undertaking the post-operative treatment of surgical cases, which in this area often require very detailed knowledge and skill to secure satisfactory results. C. C.

POST-MORTEMS AND MORBID ANATOMY. By Theodore Shennan, M.D., F.R.C.S.Edin. Second Edition. London: The Scientific Press, Faber and Gwyer, Ltd. 1927. Pp. viii + 664. 214 illustrations. Price 25s.

The average textbook on pathology makes but a limited appeal to those who are not specialists on the subject. This is because, as a rule, the descriptions deal chiefly with the microscopic structure of the diseased tissues or organs, so that in order to understand them properly and to apply them to one's own cases it is necessary to be acquainted with the normal structure of the organs and to have the means of producing good sections for microscopic examination. Unfortunately, owing to lack of opportunity and to the insistence of more pressing claims, the majority of us, after we qualify, allow our knowledge of histology to fade from our memories, and would feel loth indeed to use our scrappy recollections as a basis from which to judge abnormality, even were we able to produce the necessary sections.

Everyone, however, has occasionally to carry out a post-mortem examination, and would appreciate a reliable guide and book of reference to aid him therein. Such a guide is to be found in Professor Shennan's book, which is not, however, merely a synoptical description of post-mortem appearances, but is a complete textbook of pathology in which the main emphasis lies on macroscopic appearances and changes.

The first chapters deal with the technique of conducting an autopsy. In discussing the protection of the operator against casual infection, the author stresses the importance of never allowing blood or discharges to dry on the surface of the skin.

The organs and systems are treated in the order in which they are normally exposed during a post-mortem examination. In each case the best method of examining the parts is fully discussed and careful detailed accounts of the normal state are given, followed by descriptions of pathological changes which may occur. Although most attention is paid to naked-eye appearances and changes, ample reference is made to the microscopic changes which underlie the conditions. The excellent illustrations

are photographs of museum specimens, and are very helpful in amplifying the text.

The final chapters of the book are devoted to autopsies in cases of death from poisoning, to medico-legal reports, and lastly, to the technique of microscopic methods.

There are certain sections of pathology which, largely on account of terms being differently defined by different authorities, are very often shrouded in obscurity to the average student, and to these sections one turns with more interest than to more straightforward matters. One such subject is diseases of the arteries. No one, however, need suffer from any doubt or confusion after reading Professor Shennan's description. Monckeberg's sclerosis is placed among the degenerations. Eudarteritis (or arteritis) is divided into acute and chronic, the latter including syphilitic, tuberculous, and non-specific endarteritis obliterans, while atheroma and arterial sclerosis are described separately under the heading of chronic arterial hyperplasias. As the result of this logical sequence the subject ceases to be formidable. Alas that it is impossible to say the same of the chapter on diseases of the kidney, in particular that portion describing nephritis. The author himself seems rather unhappy about this. To quote his own words, "nephritis includes a number of different acute and chronic lesions which cannot be sharply differentiated from each other, and although, for a proper comprehension of the changes found, certain definite varieties must be described, it should not therefore be assumed that these definite types occur, invariably, or even commonly, in actual practice. . . . Although the changes will be described under the headings of acute, intermediate or subacute, and chronic, it must be remembered that one may meet with all these stages in the same kidney." It is a truism to say that pathology is not an end, but a means to an end, a means to assist the clinician to the better understanding and treating of his cases. Has not the time come when, as far as this classification is concerned, we should, in the words of the late Lord Fisher, "sack the lot." The practical point, as far as the clinician is concerned, is that there are two main types of nephritis, the azotæmic and the hydræmic type—others may be defined in the future, but this does not alter the point. Surely these physiological changes are the changes of prime importance, and surely a classification based thereon, correlating or attempting to correlate change of structure with change of function would be not only simpler in every way, but of infinitely greater practical value than the present system. The latter is based on naked-eye and microscopic appearances alone, and, were it clear cut, would still be hopelessly cumbersome. In its overlapping condition it is but "confusion worse confounded," and, moreover, leads nowhere.

This is a criticism of a very small section of a book which as a whole possesses that intangible but important asset called being "readable." Furthermore, the binding is substantial and attractive, the size is convenient, and altogether it would be hard to find a pathology book more suited to the needs of the Army Medical Officer.

HANDBOOK OF DISEASES OF THE EAR, NOSE AND THROAT. By W. S. Symes. Second edition. Edinburgh: E. and S. Livingstone. 1927. Pp. xv + 400. Price 12s. 6d. net.

This is a small book which gives a brief description of the clinical essentials in ear, nose and throat surgery. Written as it is for practitioners and medical students rather than for specialists, its brevity is welcome.

There are no anatomical descriptions, and references to various instruments (i.e., Souttar's tubes, Michel's mirrors, the directoscope, etc.), without illustrations and short descriptions are apt to confuse the reader.

The description of the tonsillectomy operations is apt to create the erroneous impression that considerable hæmorrhage is usual. It is interesting to learn that the author advocates enucleation of tonsils during the active stage of peritonsillar abscess formation.

The small paragraph on median rhinoscopy (p. 9) is obscure.

The chapter on otosclerosis seems rather too brief to convey a clear idea to the student.

Expressions such as "A cool diet"; "If thought necessary"; "Twenty per cent cocaine and adrenalin"; "In the usual way"; are apt to prove confusing to the student.

A misprint occurs in the illustration facing p. 248, illustrating the tympanic membrane (left drum shown as right, and vice versa).

The book is an entertaining and remarkably brief survey of ear, nose and throat work, and should prove useful to medical students who know their anatomy and are conversant with ear, nose and throat instruments.

Useful formulæ are given in a chapter at the end of the book.

The illustrations and X-ray photographs are ample and excellent.

THE CONSTITUTIONAL FACTOR IN DISEASE. By Arthur F. Hurst, M.D., F.R.C.P. London: Kegan Paul, Trench, Trübner, and Co., Ltd. 1927. Pp. 93. Price 2s. 6d.

This little volume of the Psyche Miniature Series stresses the importance of the study of man as well as the study of the malady with which he is afflicted. The author feels that with the many recent advances which have been made in the bacteriological, biochemical and physical methods of the investigation of disease, the constitutional factor and the whole question of diathesis does not receive the serious consideration of the physician. He believes that a better knowledge of constitution and diathesis should make it possible to prevent some diseases regarded as unpreventable, to recognize others in an early stage and to avoid recurrences in recurrent disorders when one attack has been overcome.

He then proceeds to consider shortly the gastric diatheses, the relative importance of constitution, pregnancy and infection in the development of

gallstones, diabetes, the constitutional variations in the reaction of the urine, blood-pressure and constitution and the constitutional factor in asthma, epilepsy and migraine.

We recommend this little book.

W. L. W.

Correspondence.

OLD-TIME LEPROSY.

TO THE EDITOR OF "THE JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—If any of your readers have copies of the *Journal* for the months of December, 1925, and May, 1926, which they require no longer, I should be most grateful for the leaves containing the papers commencing on page 410, and page 321, respectively.

R.A.M. College,
April 20, 1928.

I am, &c.
W. P. MACARTHUR,
Brevet Lieutenant-Colonel, R.A.M.C.

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Original Communications.

REPORT ON AN INVESTIGATION OF DYSENTERY AND DIARRHŒA IN POONA¹.

PART I.

GENERAL FINDINGS AND EPIDEMIOLOGY.

BY MAJOR J. A. MANIFOLD, D.S.O.

Royal Army Medical Corps.

ASSISTED BY

ASSISTANT SURGEON A. J. DeMONTE.

Indian Medical Department.

POONA, during the monsoon period, has for many years been noted for its intestinal disorders. Various investigations in the past have been carried out in this connexion, notably by Lieutenant-Colonel J. Morison, I.M.S. [1] [2], the results and conclusions of whose work were published in 1915 and 1916. Colonel Morison's conclusions were in brief that:—

(a) It was impossible to separate the various intestinal disorders, varying from colic and dyspepsia to the most severe types of dysentery and choleraic diarrhœa, either clinically or bacteriologically, and, for the purpose of his report, all were included together under the term "Poona diarrhœa."

(b) That though the prevalence of flies bore a close relation to the intestinal disorders in the early period of the monsoon, this was not

¹ Reprinted by kind permission from the *Indian Journal of Medical Research*, vol. xv, No. 3, January, 1928.

so after the month of August, when flies rapidly diminished in numbers. Nor apparently were flies ever found to be carrying any organisms definitely known to be causative of intestinal disease.

(c) The diarrhœa was apparently more closely connected with the rainfall, and probably was due to pollution being washed into Lake Fife, and distributed by the Poona water supply some six days later.

Early in 1925 it was realized :—

(1) That intestinal troubles were common among the troops apart from the monsoon period, and that much of the so-called diarrhœa was a mild form of bacillary dysentery, mainly caused by organisms of the Flexner group.

(2) That cases sufficiently severe to merit much clinical attention were usually considered to be protozoal in origin, and along with many of the milder cases had in the past been treated with emetine.

(3) That protozoal infections in reality were rare in comparison with the bacillary infections.

(4) That many of the laboratory diagnoses in the past, in the light of modern knowledge, were probably incorrect and misleading. These findings were published in the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS [6].

During the period between 1914 and 1925 considerable light has been thrown on the intestinal disorders of the East. Numerous observers have shown that, throughout the entire East, bacillary dysentery, particularly due to infections with the *Bacillus flexner* group, is extremely common. In India, Lieutenant-Colonel Cunningham, I.M.S. [3], has shown that in Madras and Bengal bacillary dysentery infections were frequent, and that a large percentage of the Indian population (22 per cent) suffered from "latent bacillary dysentery," i.e., a mild relapsing type, which from its very mildness is a danger from the carrier aspect.

Majors Acton and Knowles [4] showed that a similar high incidence of bacillary dysentery existed in Calcutta. These latter, and numerous other observers, had demonstrated the importance of the bacillary exudate as a microscopic method of diagnosis. The fact that the *B. flexner* group was responsible for attacks of intestinal inflammations resulting in clinical manifestations varying from a mild diarrhœa to a severe attack of dysentery had been recognized. In 1919 the Medical Research Committee had published the work of Andrewes and Inman [5] in which the various known strains of *B. flexner* were collected, and placed in definite standard strains. Dreyer's method of agglutination and its advantages had been recognized. This method of agglutination had been brought into use wherever careful standardized methods of agglutination were carried out.

The general sanitary arrangements in Poona in 1925 appeared to be similar to those existing in 1913, when Colonel Morison carried out his

investigations, with, however, the important exception that, as a result of Colonel Morison's work, what appears to be an efficient chlorination of the water supply, under careful bacteriological and chemical control, has been instituted. The results of bacteriological examinations of the chlorinated water are recorded daily, and lactose fermenters are never present in 100 cubic centimetres. The writers have confirmed this on many occasions.

Cholera is practically unknown now in Poona city and the few enteric cases met with among the troops have been proved to be due to carriers. No suspicion of a water-borne epidemic has arisen.

In contrast to the above, the intestinal disorders still persist throughout the year, with approximately the same seasonal rise as in previous years. In the two years under review, however, there has been no suggestion of any epidemic, as apparently occurred in the past. For example, in August, 1926, the worst month of the year, there occurred among the military population sixty-six cases of bacillary dysentery and forty cases of diarrhoea. These numbers among a population of close on 8,000 individuals (British and Indian) cannot be considered in the nature of an epidemic. It may also be pointed out that the above figures represent closely the "true" number of cases occurring among the troops in the station, and that many of the dysentery and diarrhoea cases, in the absence of specific orders, would not have reported sick owing to the mildness of their attacks. In 1925 the numbers were only rather more than half the above, largely due to the absence of specific orders that all such cases were to report sick.

In view of the new facts which have come to light in the past ten years and the presumption that, if chlorination of the water supply was efficient, the existing dysentery and diarrhoea must be due to other factors than the water supply, it appeared that the time had come to reconsider the subject of the intestinal disorders in Poona and Kirkee.

The points we hoped to investigate were :—

(1) To separate true bacillary dysentery as far as possible from simple diarrhoea due to other causes and to ascertain its true incidence among British and India troops.

(2) To follow the seasonal incidence of the dysentery and its relation to the rainfall, humidity and fly prevalence.

(3) If the period of increased fly prevalence was proved to correspond with the period of increased dysentery among the troops, to examine as many flies as possible bacteriologically for the presence of dysentery bacilli.

(4) To ascertain whether the latent bacillary dysentery which Colonel Cunningham had shown to be present among the Indian population was a source of danger to the troops.

(5) To make a serological study of the agglutination reactions of cases known to be suffering from bacillary dysentery (*Shiga* and *Flemer*), both in

cases from which bacilli had been isolated in the laboratory and in cases where laboratory technique had failed to isolate the infective organisms (dysentery group).

(6) To study the serological reactions of the organisms of the Flexner group isolated, with a view to finding whether they agreed with those classified by Andrewes and Inman.

(7) To study the agglutinin content of serum from normal individuals (British and Indian) to *B. flexner* and *B. shiga*.

The results of our investigations are not as complete as we had hoped, but routine laboratory work had naturally to take first place, and much of the work has perforce been carried out in the little spare time available after the routine day's work had been completed.

The work ceased suddenly in October, 1926, owing to the unexpected transfer of one of us to another station, and, as a result, much of the serological work remains uncompleted.

INCIDENCE AND NATURE OF POONAITIS.

Results of Work in 1925.

This year was largely spent in finding out the nature of the intestinal disorders with which we had to deal. As stated above, it was soon evident that we were dealing chiefly with a mild type of bacillary dysentery, and not with a simple diarrhœa; also that many specimens did not reach the laboratory from these cases. Considerable propaganda was necessary among hospital staffs, particularly subordinates, in order to break down the fixed traditions of former years. The laboratory staff had also to be trained in proper technique. More equipment had to be collected and proper media prepared, etc.

Table I gives the number of cases from whom specimens of blood and mucus were sent to the laboratory from the British and Indian military hospitals at Poona and Kirkee.

It will be noted that these specimens are divided into those showing a typical microscopic exudate of bacillary dysentery and those reported on as showing an indefinite exudate. The latter term is used throughout this report to define specimens in which only a few polymorphonuclear leucocytes were found under the microscope, careful search often being necessary. In many of these cases fæces were present in the specimen along with the mucus. These exudates were found in (a) very mild cases, (b) cases in the early stages of the dysenteric attack, (c) cases from which specimens were sent to the laboratory for the first time about the fourth to fifth day after onset of symptoms, i.e., recovering cases. In addition, it should be pointed out that a laboratory is entirely dependent on the hospital personnel for the selection of a suitable sample for bacteriological examination, and usually this important factor is left to unskilled subordinates. If the entire specimens could have been sent to the

laboratory, the number of indefinite exudates recorded and the negative results would have been fewer in number. From hospitals situated some miles from the laboratory the sending of entire specimens was naturally impossible. From many of these, however, *B. flexner* was isolated, and, whether or not, all cases were treated as bacillary in origin

TABLE I.—1925, POONA AND KIRKEE.

Month	British troops					Indian troops					Total British and Indian troops				
	<i>E. histolytica</i>	Total bacillary dys- entery cases	Definite bacillary exudate	Indefinite bacillary exudate	Number of dysentery organisms isolated	<i>E. histolytica</i>	Total bacillary dys- entery cases	Definite bacillary exudate	Indefinite bacillary exudate	Number of dysentery organisms isolated	<i>E. histolytica</i>	Total bacillary dys- entery cases	Definite bacillary exudate	Indefinite bacillary exudate	Number of dysentery organisms isolated
January .. ..	..	3	2	1	2	..	5	5	..	1	..	8	7	1	3
February	1	8	8	..	2	..	3	3	..	2	1	11	11	..	4
March	1	..	..	..	..	..	1	1	..	1	1	1	1	..	1
April	1	12	10	2	1	2	8	5	3	..	3	20	15	5	1
May	1	11	6	5	3	..	6	4	2	4	1	17	10	7	7
June	1	22	13	9	7	..	15	7	8	2	1	37	20	17	9
July	2	20	11	9	8	1	18	11	7	4	3	38	22	16	12
August	6	9	7	2	7	1	16	13	3	11	7	25	20	5	18
September ..	1	3	2	1	3	..	4	4	..	4	1	7	6	1	7
October	2	3	1	2	..	1	6	5	1	5	3	9	6	3	5
November ..	1	3	2	1	1	..	6	6	..	6	1	9	8	1	7
December ..	1	1	1	..	..	..	7	5	2	2	1	8	6	2	2
Total ..	18	95	63	32	34	5	95	69	26	42	23	190	132	58	76

TABLE II.—CASES FROM ALL SOURCES SHOWING DEFINITE BACILLARY EXUDATES
FIRST EXAMINATION, 1925.

Month	Number of exudates	<i>B. flexner</i>	<i>B. shiga</i>
January ..	8	4	..
February ..	11	2	2
March ..	1	1	..
April ..	15	1	..
May ..	12	6	1
June ..	26	6	4
July ..	27	10	1
August ..	23	15	5
September ..	6	6	..
October ..	7	4	..
November ..	8	6	2
December ..	13	4	2
Total ..	157	65	17

unless amœbæ was found, i.e., treatment was entirely by salines. All responded quickly to this treatment, and as will be seen later serological examination showed that fifty per cent of this type of cases in 1926 gave a rising agglutination titre to *B. flexner*.

From the table it will be noticed that the numbers of British and

Indian troops reported on as suffering from a true dysentery were identical at the end of the year. In view of Colonel Cunningham's work this seemed improbable, but the Indian troops pay less attention to these mild attacks of diarrhœa with blood and mucus, and do not report sick to the same extent as the more highly educated British soldier.

In 1926 the cases among the Indian troops exceeded the British.

Twenty-three cases only of amœbic dysentery occurred among British and Indian troops during the twelve months of 1925, in striking contrast to the numbers occurring in previous years.

Table II gives the cases among troops and families showing definite bacillary exudates, and the nature of the dysentery organisms isolated. From 52·2 per cent of cases dysentery bacilli were isolated (sixty-five *flexner* and seventeen *shiga*).

The rise in the incidence of cases in the months of June, July and August is apparent from the above tables.

From our experience in this year it was evident that, provided specimens from all cases of diarrhœa were sent to the laboratory, we should have little difficulty in separating true dysentery from the diarrhœa and colitis of the past. It was particularly evident that cases among the Indian troops, and to a less extent among British, were in the habit either of not reporting sick at all or too late for a positive laboratory diagnosis, and that therefore we had not arrived at the true incidence of diarrhœa in 1925.

We found that once laboratory media and technique were good, the question of a positive or negative result depended not on the laboratory, but on the hospital concerned. If a keen medical officer or a keen assistant, or sub-assistant surgeon were in charge of the dysentery ward the number of positive results increased accordingly. In fact, a change in the personnel of these wards could be invariably diagnosed in the laboratory by a sudden drop in the number of positive results. Assistant and sub-assistant surgeons should be instructed and constantly kept up to the mark as to the importance of sending specimens quickly from dysentery cases to the laboratory, and also as to the correct portion of the stool which should be selected for dispatch.

Generous financial help was obtained from the Indian Research Fund Association, and steps were taken to make a closer study during the year 1926. The initial arrangements carried out were as follows :—

(1) Orders were issued through the officers commanding units that all cases suffering from diarrhœa were to report sick at the earliest possible moment. Local arrangements were made with the various medical inspection rooms for the collection and dispatch of specimens to the laboratory.

(2) Printed instructions were given to medical officers and assistant surgeons, pointing out the difficulties connected with laboratory examination of dysentery stools, and the various important details connected with the collection of specimens.

TABLE III.—1926, JANUARY-SEPTEMBER.

Month	British troops					Indian troops					Total British and Indian troops				
	<i>E. histolytica</i>	Total bacillary dysentery cases	Definite bacillary exudate	Indefinite bacillary exudate	Number of dysentery organisms isolated	<i>E. histolytica</i>	Total bacillary dysentery cases	Definite bacillary exudate	Indefinite bacillary exudate	Number of dysentery organisms isolated	<i>E. histolytica</i>	Total bacillary dysentery cases	Definite bacillary exudate	Indefinite bacillary exudate	Number of dysentery organisms isolated
January	2	7	4	3	3	1	8	6	2	6	3	15	10	5	9
February .. ..	..	12	11	1	8	..	13	12	1	9	..	25	23	2	17
March	1	12	8	4	7	..	14	10	4	2	1	26	18	8	9
April .. ..	..	11	7	4	5	..	7	5	2	3	..	18	12	6	8
May	2	13	8	5	4	..	15	10	5	6	2	28	18	10	10
June .. ..	..	8	8	..	6	1	26	22	4	17	1	34	30	4	23
July .. ..	..	29	21	8	15	..	32	24	8	16	..	61	45	16	31
August	2	32	19	13	10	1	34	25	9	22	3	66	44	22	32
September ..	1	18	11	7	7	2	19	10	9	7	3	37	21	16	14
Total ..	8	142	97	45	65	5	168	124	44	88	13	310	221	89	153

TABLE IV.—NUMBER OF CASES OF DYSENTERY AND DIARRHŒA AMONG UNITS IN POONA AND KIRKEE TO END OF AUGUST, 1926.

Unit	January		February		March		April		May		June		July		August	
	Dysentery	Diarrhœa	Dysentery	Diarrhœa	Dysentery	Diarrhœa	Dysentery	Diarrhœa	Dysentery	Diarrhœa	Dysentery	Diarrhœa	Dysentery	Diarrhœa	Dysentery	Diarrhœa
(British)																
1st K.S.L.I. ..	3	1	4	4	1	7	5	..	3	2	1	..	8	9	8	8
1st R.W.K. ..	2	2	3	1	1	3	3	1	1	2	3	..	4	10	8	10
R.A., Kirkee ..	2	..	5	3	10	2	1	1	1	2	..	..	6	8	6	7
R.A.O.C. ..	..	..	..	..	..	2	..	..	..	..	..	..	2	2	1	..
I.A.O.C. ..	..	..	..	..	..	..	1	..	..	..	..	..	4	1	1	..
Staff and Departments	1	..	1	2	..	1	..	..	3	..	2	3	4	1	2	3
Other ranks	..	..	1	..	..	2	2	..	5	1	3	..	3	3	6	6
(British)																
(Indian)																
2nd Lancers ..	4	..	2	..	4	1	1	1	4	..	5	1	5	..	4	2
3-16th Punjabis ..	1	1	1	1	4	2	2	..	1	..	5	1	5	1	9	1
1-15th Punjabis ..	..	..	..	..	..	..	1	..	2	..	1	..	3	..	2	1
11th I.B.T. Company	..	..	3	2	1	..	1	..	4	..	6	..	3	2	4	3
Indian Hosp. Corps.	2	1	1	2	1	4	1	5	1	4	..
R.B.S. and M. ..	2	..	2	..	3	..	1	1	2	..	1	..	2	2	6	..
1-2nd B. Pioneers	2	2	..	2	1
Other Ranks	1	..	1	1	3	..	5	..	3
(Indian)																

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(3) Weekly returns of all cases reporting sick with diarrhœa were sent to the laboratory from each M.I. room in order that the number of specimens examined could be checked by the numbers reporting sick.

(4) Printed case sheets were issued to medical officers interested on which a complete record of the important signs and symptoms of dysentery cases could be briefly noted.

DYSENTERY, DIARRHŒA CASE SHEET.

<i>Number</i>	<i>Rank</i>	<i>Name</i>	<i>Unit</i>
<i>Age</i>	<i>Date of onset</i>	<i>Date on which first reported sick</i>	
Number of previous attacks		DAYS OF DISEASE	
Number of courses of emetine		1	2 3 4 5 6 7 8 9 10 11
Macroscopic appearance of stools	1. Blood present		
Colour	2. Colour of blood		
	3. Presence of mucus		
Reaction	4. Presence of fæces		
History of onset (Vomiting), &c.	5. Reaction of stool		
Pain—Nature and site	Temperature	Morning	
Tenderness and site		Evening	
Tenesmus			
Any other prominent signs or symptoms			
Duration of illness			
Treatment			
Suggested causative factor			
	1. Food		
	2. Chill		
	3. Exhaustion		
	4. Any other cause		
Any similar cases among associates			

(5) Arrangements were made for as many cases as possible to be investigated serologically by having blood withdrawn at the commencement of the disease, and on the eighth, twelfth, sixteenth and twenty-third day after onset of symptoms.

(6) Fly traps were distributed throughout the barracks by Major G. Wallace, A.D.H. and P., Southern Command, and a weekly record was requested from the M.O. in whose area they were placed.

RESULTS IN 1926 TO END OF SEPTEMBER.

Table III illustrates the number of cases reported on as suffering from dysentery. By the end of September the numbers were 142 British troops and 168 Indian troops, a great increase on the numbers occurring in 1925. This increase was in the main due to the orders regarding all troops reporting sick at the onset of an attack of diarrhœa. In the nine months there was a total of 310 cases of bacillary dysentery as compared with 190 in the twelve months of 1925. Only thirteen cases of amœbic dysentery were encountered.

Table IV gives the distribution of bacillary dysentery and diarrhœa among the various units. On the whole in proportion to the numbers of individuals in the units the incidence was much the same throughout the cantonment. It was noted that the Indian troops suffered less from diarrhœa than the British troops, but, as was expected, gave a higher incidence of dysentery, probably due to relapses in cases suffering from the condition termed by Colonel Cunningham, "latent dysentery."

TABLE V.

				Bacillary dysentery	Diarrhœa
January ..	..	..	..	15	17
February ..	..	..	..	25	14
March ..	..	..	..	26	16
April ..	..	..	..	18	8
May ..	..	..	..	28	24
June ..	..	..	..	34	14
July ..	..	..	..	61	46
August ..	..	..	..	66	40
September ..	..	..	..	37	19
				61 per cent	39 per cent

Table V shows the total numbers of bacillary dysentery and diarrhœa cases during the eight months for British and Indian troops combined. It will be noted that sixty-one per cent of cases were true dysentery and thirty-nine per cent diarrhœa. As in former years, cases occurred in all months, quite apart from the rainy season, but a rise in the number of cases commenced in June and increased in July and August, dropping in September.

By the end of August 200 definite exudates and 73 indefinite exudates had been bacteriologically examined. From the former *B. flexner* was isolated in sixty-one per cent of cases, and *B. shiga* in ten per cent of cases. From the latter exudates *B. flexner* was isolated in twenty-six per cent of cases (seventeen *B. flexner*, two *B. shiga*).

Clinically by far the greater majority of the cases were extremely mild in character, the symptoms being usually those of a fairly acute diarrhœa, followed by the appearance of blood and mucus in the stools. In a comparatively large percentage fæces persisted in the stools throughout the attack, and blood and mucus were passed only in small quantities. This mild form of dysentery is typical of the condition known throughout the

Cantonment as "Poonaitis." All grades of severity, however, were met with, up to really severe acute bacillary dysenteric attacks with high temperatures, severe tenesmus, and frequent stools consisting entirely of blood and mucus. The severity of the attacks appeared to depend very largely on the promptness with which proper treatment was instituted during the preliminary diarrhœa. Both *B. shiga* and *B. flexner* were isolated from very mild cases, and very severe cases, i.e., the severity of the attack gave no indication of the nature of the causative organism. The *B. shiga* infections in 1925 were distinctly more severe than in 1926, when these cases reported sick as soon as diarrhœa commenced.

Cases from which *B. schmitz* was isolated were distinctly severe in nature. Blood and mucus, on the average, persisted longer in the stools than in the *shiga* and *flexner* infections. The temperature, although not high, remained raised for several days, whereas in *shiga* and *flexner* infections the temperature almost invariably dropped to normal after treatment by serum and salines had been instituted.

Careful records were kept by Captain W. Aitchison, M.C., I.M.S., on the special case sheets provided by the laboratory, of 150 patients.

In this series of cases the average day after onset of symptoms on which blood was found microscopically to be present in the stools worked out at 4·6 days.

Mucus was found to persist up to the 5·45 day.

Fæces remained present in the stools throughout the illness in 32·5 per cent of cases.

In the more severe cases, in which the fæces had been replaced entirely by blood and mucus, fæces were reported as again being present in the stools on the following days after onset of symptoms:—

Second day	..	..	..	15·32	per cent of cases
Third day	..	..	..	24·19	" "
Fourth day	..	..	..	22·03	" "
Fifth day	..	..	..	14·51	" "
Sixth day	..	..	..	12·9	" "
Seventh day	..	..	..	3·22	" "
Ninth day	..	..	..	0·8	" "

Major J. Dowse, M.C., R.A.M.C., specially noted the clinical aspect of the dysentery and diarrhœa among British children admitted to the family hospital:—

These cases fell into two fairly well-defined classes:—

(a) "Green diarrhœa" cases, with little mucus, and rarely blood in the stools. Occasionally mucus was present in considerable quantities.

This type of case was found mainly in very young children, i.e., under 2 years of age, and was considered by Major Dowse to be due *not* to *flexner* or *shiga* infection, but to faulty feeding causing excessive fermentation, etc., "as a result of which various organisms, *B. morgan* No. 1, etc., are no longer inhibited and give rise to intestinal inflammation." The bacterio-

logical control of these cases was not accurate, however, owing to the difficulties encountered in collecting and dispatching stools to the laboratory. If the stools could have been examined shortly after passage and in the early stages of the disease, possibly many would have been found to be due to one or other of the dysentery bacilli. In such cases the children's napkins were usually sent to the laboratory, and the specimens were frequently dry on their arrival.

(b) Children over 2 years old showed symptoms in no way differing from the ordinary mild or severe bacillary dysentery found among adults. Most of these cases were *B. flexner* infections.

Amoebic diarrhoea, or amoebic dysentery, was never discovered among children after Major Dowse took over charge of the family hospital.

We actually did find "*E. histolytica* cysts" once in the stools of a boy 12 years of age.

Another point which appears worth noting was the regularity with which children suffering from dysentery, and treated in quarters, infected the mother, or other children in the same household in three to four days. No carriers were ever discovered among the servants. In two instances in which typing of *B. flexner* was carried out, the strain of bacillus isolated was the same in the mother and child.

It would appear, therefore, to be indicated that all dysentery cases among children should be treated in hospital, and not in quarters.

From the above observations it is obvious that "Poonaitis" is largely bacillary dysentery, and that the main infective agent is *B. flexner*; *B. shiga* taking only a minor part.

Of the thirty-nine per cent in which no blood or mucus was seen in the laboratory, small numbers were found to be due to *B. aertrycke* (3), *B. gaertner* (1).

B. flexner was isolated from five, and was probably responsible for more, if the well-known difficulty in isolating this organism apart from its presence in mucus be taken into consideration. *Giardia intestinalis* accounted for a certain number particularly among the British troops, and the remainder were probably due to the above three agents, plus indiscretions of diet, chills, etc.

The same type of cases occur throughout the year and increase definitely in the monsoon period.

Serological examinations on 101 individuals suffering from "dysentery group" infections (i.e., cases with bacillary exudates, but no dysentery bacilli isolated) confirmed our opinion that the majority of these cases were *flexner* infections; 57.4 per cent of these cases demonstrated a rise in their agglutinin content to *B. flexner* after their attack of dysentery. Serological examinations of cases of definite *flexner* infections showed that only 71.9 per cent produce an increase in agglutinin content to *B. flexner*.

None of the dysentery group cases developed an increased agglutinin content to *B. shiga*.

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A detailed account of these serological examinations is given in Part II of this Report.

It will be seen from Chart I giving the hospital admissions for amœbic

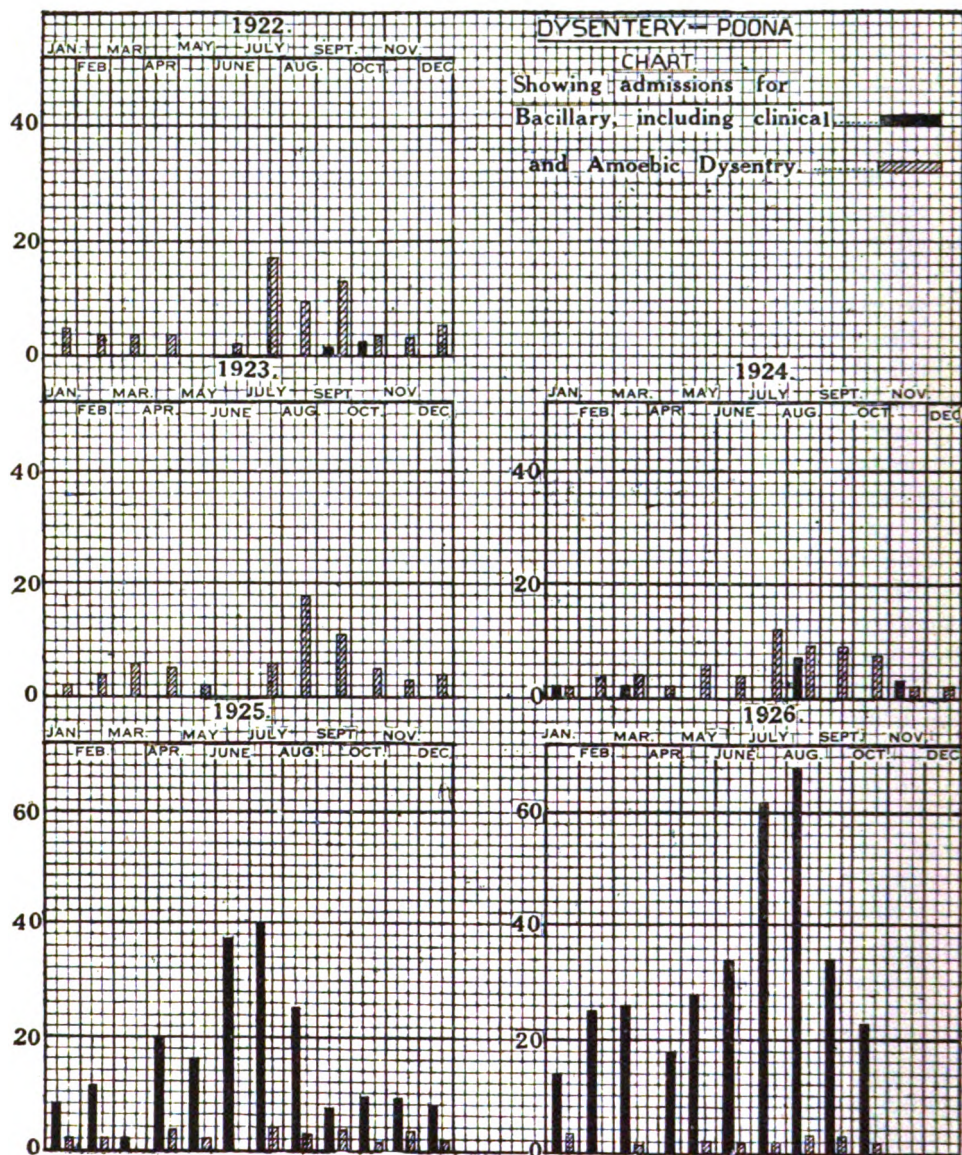


CHART I.

and bacillary dysentery (including "dysentery group") for the past few years how large a number of dysentery cases must have been diagnosed under other headings in the past. The drop in the number of amœbic

infections is also evident—and we would emphasize the fact that none of the “dysentery group” cases have been treated with emetine during the years 1925-26.

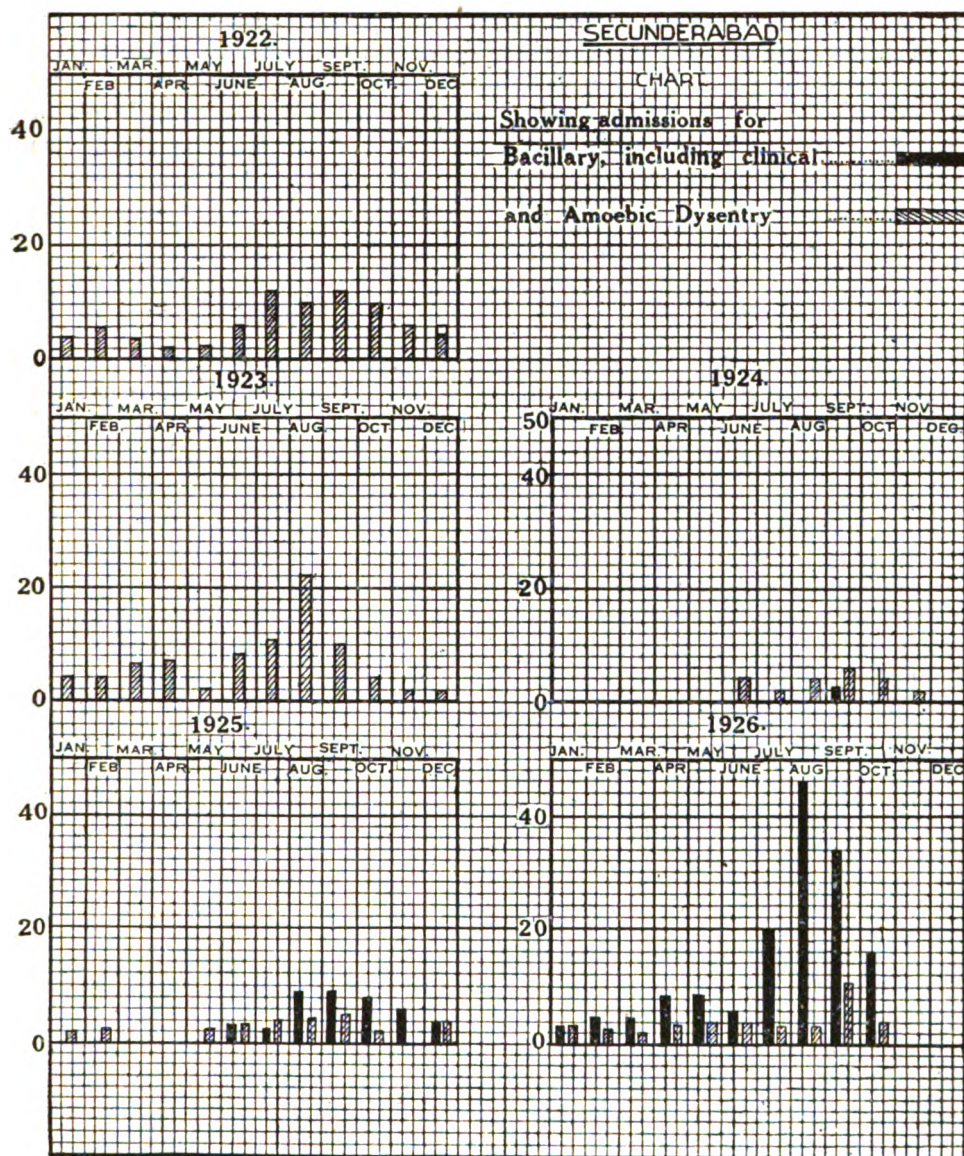


CHART II.

That similar conditions exist in other places than Poona is shown in Chart II, giving the incidence of dysentery cases in Secunderabad for the same periods. Captain Loganadan, I.M.S., took up the investigation in

the brigade laboratory there in the autumn of 1924, with results similar to those we obtained in Poona. A rise during the monsoon period is also seen, and the predominant organism found is *B. flexner*.

Secunderabad is chosen as an illustration, as it has been considered in the past one of the worst stations in India as regards amœbic dysentery.

Similar conditions to those demonstrated in the above two stations have been found by other military laboratories also during 1925-26, in many other parts of India, both north and south, and that there is little doubt that India, as far as the Army is concerned, will shortly fall into line with other eastern countries in this question of the differential diagnosis of the dysenteries.

SUMMARY OF CONCLUSIONS.

(1) Poonaitis is largely a mild *B. flexner* infection, and owing to its mildness has not been diagnosed as dysentery in the past.

(2) Bacillary dysentery, again mainly *B. flexner* infection, accounts for most of the more severe cases of dysentery. These cases were usually diagnosed amœbic dysentery in former years.

(3) *B. shiga* plays only a minor part in the production of dysentery in Poona, and if such cases report sick on the first or second day of the attack and are treated at once, the cases are usually as mild as the *B. flexner* infections.

(4) By the microscopic examination of mucus, it is possible to separate mild bacillary dysentery from diarrhœa in nearly all cases, if the hospitals and laboratory co-ordinate properly.

(5) "Dysentery group," as a diagnosis, is a confession of failure, and in the main such cases in Poona have been *B. flexner* infections.

(6) Bacillary dysentery and diarrhœa are present throughout all months of the year and increase in numbers in the monsoon period.

(7) Amœbic dysentery is a comparatively rare disease among the troops as contrasted with the prevalence of bacillary dysentery.

EPIDEMIOLOGY.

The next step in the investigation was as far as possible to ascertain the source of infection, and the method by which infection was conveyed to the troops.

For the description of the sanitary arrangements existing in Poona given below, I am indebted to Major G. Wallace, O.B.E., R.A.M.C., A.D.H. & P., Southern Command.

Poona.

Poona—consisting of Poona city, the cantonment, part of the suburban municipality and the railway area—is situated on the right bank of the Mutra-Mula River at a height of about 1,850 feet above sea-level.

The ground is undulating from east to west with drainage to the north towards the river by means of several nullahs.

The city is generally lower than the cantonment.

The soil consists of stratified trap rock which frequently outcrops on the surface, but in other places is covered by hard moorum.

Climate.

The hot weather lasts from March till the end of May, the maximum temperature reached being about 110°F. in May.

The rains begin early in June and last till the end of September, the total rainfall being about twenty-seven inches per annum.

In the cold weather the days are bright and warm, while the nights are cold and bracing. The maximum temperature reached in December may be as low as 42°F.

Water Supply.

The water supply is from Lake Fife, an artificial collection of water situated to the south-west of, and some 11½ miles by road, and 7 miles in a straight line from Poona city. The water from this reservoir is carried by an open canal which runs roughly north-east of the vicinity of Poona city and then passes east through the cantonment. The water in this canal is liable to pollution through the greater part of its course. The supply for the city is taken from the canal at the south-west corner near Parvati and is chlorinated. The cantonment supply is taken from the canal near St. Mary's Church, passing through settling tanks and rapid filters, and is chlorinated.

The daily bacteriological analysis of this supply throughout the year has shown a uniform absence of lactose fractors in 100 cubic centimetres. On thirty occasions, between the end of May and the beginning of November, 1926, 500 cubic centimetres were examined. Lactose fractors were found to be absent from this quantity on all occasions except one (September 2).

Sanitation.

The disposal of filth and refuse in the Poona area is still extremely unsatisfactory, although with the provision of a water carriage system, which is now under construction as a joint scheme, there is some hope of improving it.

Latrines are practically all of open types. In some parts of the area, e.g., the cantonment, attempts have been made to form public latrine groups. While such grouping is of value in ensuring better supervision, it undoubtedly leads to fouling of the ground in areas away from these groups. This is specially marked along the city side of the Manick Nullah where there are very few latrines.

In addition to the latrine groups there are many isolated latrines of private ownership, or situated in the compounds of private bungalows.

Disposal of night soil is on the removal system, and each latrine or latrine group is equipped with covered receptacles to which the pan contents are transferred pending transference to the filth carts or, as in Poona city, to the pail depots of the small water carriage system at present serving with that area.

The transfer of the pan contents to the receptacle in which they are protected from flies, takes place in the public latrines nominally twice daily. In the private latrines much less attention is as a rule paid to this, and the pan contents may remain exposed for considerable periods. In all cases the continued exposure is obviously a dangerous procedure.

From the latrines the covered receptacles are taken and emptied into the filth carts for removal to the trenching ground, except as noted above for Poona city.

There are two trenching grounds for the area. That of the suburban municipality is situated close to the river bank, and just to the north of the recently developed Koregaon Estate. It should here be noted that pan contents from a part of the suburban municipal area, situated on the left bank of the river, are carried back to the trenching ground, which is now close to a residential area.

The cantonment trenching ground is situated some 1,800 yards to the east of the cantonment boundary.

The pits of these trenching grounds are filled with a mixture of pan contents and litter, or dry refuse, which is allowed to rot, and is then dug out and sold as manure.

The soil is unsuitable for trenching, and a very large amount of fly-breeding takes place in the pits, especially in the period August to October. Close observation during the past few years has shown that few flies from these pits travel into the inhabited area.

The methods of collection of stable litter are unsatisfactory. Practically no manure pits exist, and anything like complete removal is exceptional, especially from the end of May to the end of October, when there is an addition to the annual population of some 1,200 horses assembled for the Poona racing season. Under these conditions fly-breeding from this source is exceptionally heavy.

Litter is now removed from the area by carts and motor vans, and when not used in the filth pits is stacked in heaps, where, as noted some years ago by Lieutenant-Colonel Morison, I.M.S., apparently no fly-breeding takes place.

The writers would add to these notes :—

(1) That the Manick Nullah separates the city from the cantonment, and that this nullah is in practice merely a vast open latrine.

(2) The open pans are emptied nominally by 10 a.m. and 6 p.m., and that during the remainder of the twenty-four hours the pan contents are exposed to the air.

(3) Although latrines may be available at close range, such amenities are usually disregarded by the lower-class Indian child, and the ground beside the godown is generally selected in lieu.

(4) Wherever building on any scale is proceeding, coolie camps spring up like mushrooms, and the sanitary arrangements of these often beggar description.

(5) The cantonment authorities permit officers and others to rent stables in their compounds to horse owners during the racing season, which corresponds to the dysentery season, and, as a result, 1,200 horses and their syces are scattered throughout the cantonment area, often under very unsuitable conditions.

(6) During the season there are, as a rule, race days twice a week, and on these days thousands of Indians swarm into the cantonment from Poona city, and an extra strain is thrown on the existing sanitary arrangements.

Bacillary dysentery and diarrhoea, as we have seen in Table V, are present throughout the year. There is a considerable rise in the number of cases in July and August, but there is no indication of any epidemic. Up to the end of July the average constantly sick for bacillary dysentery and "dysentery group" for British troops was 2·84 per 1,000, and for Indian troops 1·88 per 1,000. These figures also represent numbers of cases who without specific orders would not have been diagnosed as such, and among the Indian troops particularly would not even have reported sick.

METHOD BY WHICH INFECTION IS CONVEYED TO TROOPS.

Water Supply.

Lieutenant-Colonel Morison, working in 1912, 1913, traced very clearly the "monsoon diarrhoeas" to the pollution of the water supply in Lake Fife. Daily records of the rainfall in 1926 are shown in Chart III for the months of June, July, August and September, 1926. The monsoon broke on June 8, the rain fell on the 10th, 11th, 13th and 27th of this month. Rain fell almost daily in July and August, and from September 12 to 17. We can trace no direct connexion between the rainfall and the number of dysentery cases. In Chart III it can be seen that the latter (considering that they are furnished from some thousands of individuals) show no evidence of any sudden increase after the heavy rainfall recorded on the chart. Chart IV shows that there is a comparatively steady incidence of dysentery throughout the monsoon months, high from weeks ending July 23 to August 27. Heavy rain had commenced and continued daily from July 5, but during the weeks ending July 9 and 16, there were only two cases admitted per week more than in the week May 21, in which month rain had fallen on the third and fourth days only. These two weeks in July show fewer cases admitted than in the week ending February 19, a month in which there was no rain at all. Rain also fell from September 12

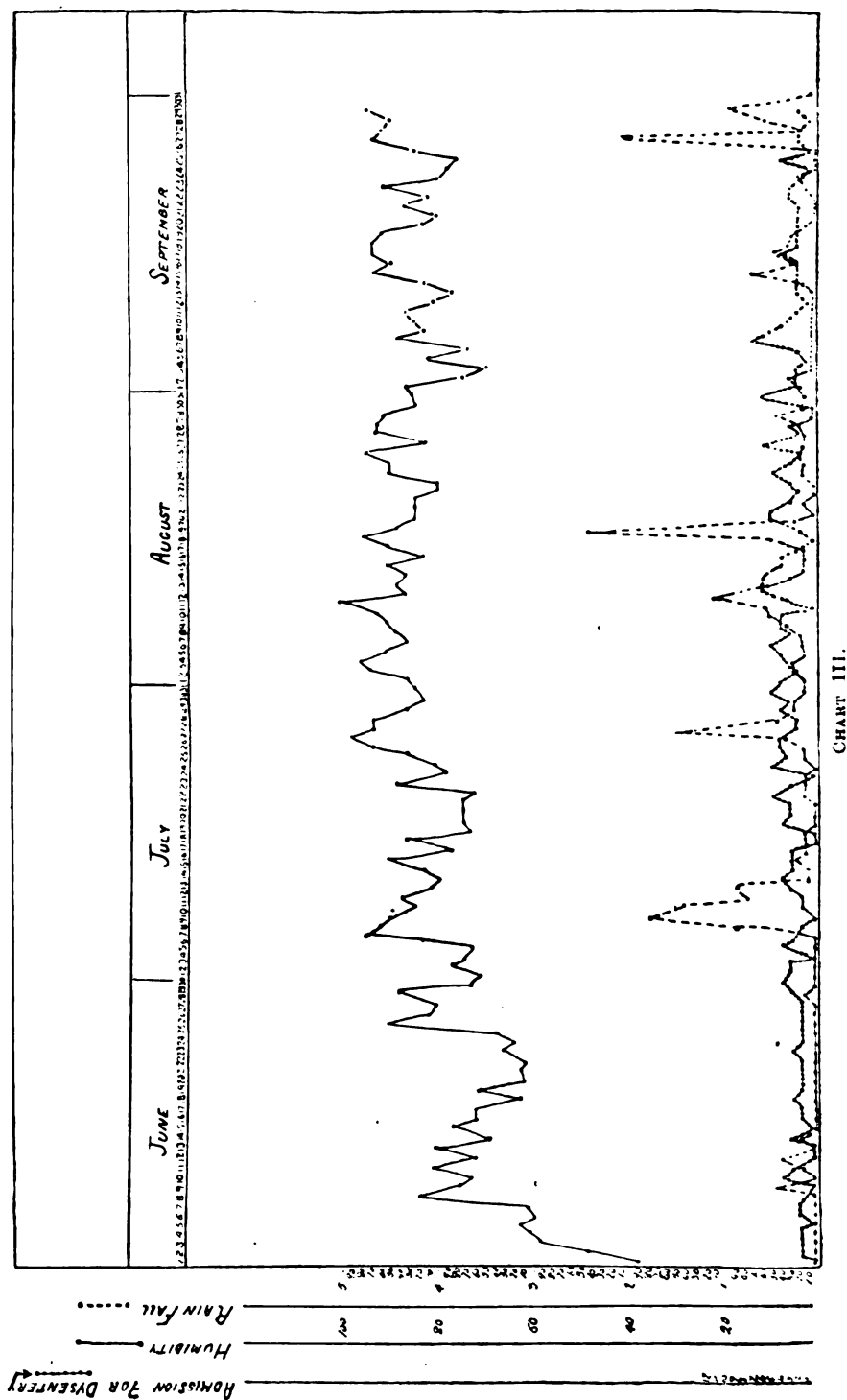


CHART III.

to 18, following on a period of ten days' dry weather, and the drop in the dysentery admissions continued. Similarly in the month of June there is no particular increase in the number of cases. In fact the number of diarrhoeas recorded was considerably fewer than in May, when except for small showers there was no rain, i.e. :—

				Dysentery		Diarrhoea
May	..	..	..	28	..	24
June	..	..	..	34	..	14

The chlorinated water is, as Major Wallace states, examined bacteriologically daily. Lactose fermenters throughout the year have been absent in 100 cubic centimetres, and during the monsoon period in thirty-nine tests were only found once in 500 cubic centimetres. We have also frequently tested the tap water in the laboratory and have never found lactose fermenters in 100 cubic centimetres. This is as high a standard of purity as could be obtained in any water supply.

That dysentery organisms are easily destroyed by other bacilli and die out soon after passage in the stools, is a commonplace, and therefore, that these organisms should remain alive in the water of Lake Fife for four days (minimum) and still persist in water which is sufficiently chlorinated to destroy resistant lactose-fermenting organisms in 500 cubic centimetres seems to us to be impossible.

Further there is no evidence of other water-borne diseases among the troops in the cantonment. Any enteric cases have been traced to carriers except for one or two isolated cases, and there have been no cases of cholera.

Whatever the conditions may have been in the past, it appears quite obvious to us that the water supply is not now concerned with the spread of either diarrhoea or dysentery in Poona, and that the rainfall, except indirectly, by producing other factors, has no connexion with the dysentery and diarrhoea increase in the monsoon.

Flies.

Fly traps were distributed by Major Wallace among the various units, and placed in cookhouses, coffee bars, institutes, etc. A record of the weekly catch was asked for from the medical officer in charge of the unit.

It was very soon found that the figures obtained would only give a very broad indication of the number of flies prevailing. For example, some medical officers were considerably more active than others in supervising the baiting of the traps and the actual counting and recording of the flies. The habits of flies were found to be extremely variable. Many units used fly-papers in addition to the traps and often these were covered with flies, while the fly-traps remained empty. There would appear often to be few flies about, and after a sudden shower of rain, flies would swarm into buildings and high catches would be recorded unexpectedly. It was found best in the end to add all the records of catches together for each week and

make a graph accordingly. The graph is shown on Chart IV, and on the whole bears a close relationship to similar observations in past years. The figures bear out also our own personal observations as to the prevalence of flies at particular periods. A glance at the graph will show that there is a very striking relationship between humidity, prevalence of flies, and incidence of bacillary dysentery. Also, it will be noticed that although the humidity remains high, the fly curve and number of dysentery cases drop in September. This was also apparent in 1925 and the same drop in the number of flies was noticed by Lieutenant-Colonel Morison in 1913. In all probability it is as he states due to a fungus such as *Empusa muscæ* found in England. Time was not available to study this matter, but it is a subject which should be investigated. Temperature, humidity, and all other conditions for fly breeding remain, but the numbers of flies invariably drop at this period of the year.

The relationship between the number of flies caught and the number of dysentery admissions is even closer than indicated in the chart.

The units returning the fly counts divided each month into four periods, and sent in numbers caught as per week. The admissions of dysentery cases were worked out for periods of seven days irrespective of the day of the week. Hence in the diagram the peak of the fly curve is shown after the peak of the dysentery curve; actually they coincided. The actual findings are shown below :—

Dysentery admissions, July and August				Number of flies caught, July and August			
Week ending July	2	..	8 cases	July	1 to 11	..	1,340
" "	" 9	..	10 "	" "	11 to 18	..	1,578
" "	" 16	..	10 "	" "	18 to 25	..	4,050
" "	" 23	..	15 "	" "	25 to 31	..	4,939
" "	" 30	..	16 "	" "	31 to Aug. 8	..	6,232
" "	Aug. 6	..	18 "	Aug.	8 to 15	..	2,803
" "	" 13	..	16 "	" "	15 to 22	..	2,810
" "	" 20	..	15 "	" "	22 to 29	..	1,855
" "	" 22	..	14 "				

It is again emphasized, however, that fly counts can only be taken as indicating within broad limits the prevalence of flies in the periods indicated. That flies were most prevalent between July 18 to about August 14 was undoubted.

Chart IV also shows well the number of fresh cases met with apart from the monsoon incidence. On the whole the number remains fairly constant, with occasional rises and falls, i.e., the sudden drop in the week ending September 3. This latter was not due to cessation of rain, as rain had fallen each day from August 22 to 31. We have, therefore, the fact that bacillary dysentery cases, diarrhœa cases, and flies are present in Poona throughout the year and largely rise and fall together. The water supply from strict bacteriological tests, and from the evidence of the relationship of the rainfall to cases, appears to have no direct relationship, under the existing conditions of chlorination, to these diseases.

The next step was to ascertain whether by bacteriological examinations the local flies could be proved to be carriers of *Flexner* bacilli.

Owing to pressure of work not many examinations of flies were carried out, but the results of the few that were done appeared to prove conclusively that not only are flies capable of acting as carriers, but that the fly infection is a heavy one. During August flies were sent to the laboratory on eight occasions from the coffee bar of the 2nd Battalion, K.S.L.I. The method of examination was carried out on lines sent to me by Dr. Manson-Bahr, i.e., twelve flies after a thorough flaming were emulsified in peptone salt solution and the supernatant fluid plated out.

On three occasions out of eight, organisms biochemically and morphologically identical with *B. flexner* were isolated. On the first occasion this organism was in pure culture on the plate. One of the three organisms isolated was agglutinated to a titre of 1-50 by *Flexner* W and Z serum (test carried out by Dreyer's method). In September two further *B. flexner* were isolated in ten examinations. Further work is being carried out on similar lines by Major Walker, R.A.M.C., now in Poona, and he informs me that he has already isolated two further *B. flexner* agglutinating with polyvalent serum.

In addition all the various other faecal organisms encountered in our bacteriological examinations of dysentery cases were isolated in these few fly examinations, including, among others, *B. morgan* No. 1 on several occasions.

The case against the fly appears to be proved, and indeed this finding agrees with experience in many other parts of India.

In places in which the conditions of the water supply, rainfall, etc., are quite different from one another—for example Quetta and Secunderabad—bacillary dysentery (*Flexner*) comes to a head in the fly season. Dr. Manson-Bahr showed some years ago that similar conditions prevailed in Fiji. Throughout the east two common factors in the production of intestinal disease can always be found, i.e., flies and faeces on which flies can feed, however much other conditions may vary.

SOURCE OF ORIGIN OF *B. flexner*.

The next step was to find the source of origin of the supply of *B. flexner* to the troops. Lieutenant-Colonel Cunningham's work had shown that latent dysentery in Madras and Bengal was extremely common. If similar conditions prevailed in Poona, the open pan latrine with its contents exposed for hours, and possibly days to the fly population, appeared to be the most probable source of infection. Civil figures from hospitals and dispensaries could not help us much, as little or no attempt has been made to separate bacillary from amoebic dysentery. The gaol population of Yarowda was well outside cantonments, and therefore could not be a source of infection. Attention was, therefore, directed to the cantonment public and servants' latrines.

Lieutenant-Colonel Reid, the cantonment executive officer, kindly gave us access to the sanitary inspectors, who arranged that the sweepers should place any specimens of blood and mucus they found into fæces collection tubes, which we provided, and that the laboratory should send daily to collect these from the cantonment office. The specimens were to be labelled with the number of the latrine from which they were collected.

June.—This series of examinations commenced on June 13. During the period June 13 to 30, fifty-two specimens of blood and mucus arrived in the laboratory. These were examined microscopically—twenty-six were definite bacillary dysentery; seventeen were reported as indefinite but suggestive of bacillary dysentery. In addition thirty other specimens of loose stools in which the sweepers stated blood and mucus were present, were received, but as no blood and mucus could be seen in the specimens they were not bacteriologically examined owing to pressure of routine work. From the fifty-two blood and mucus specimens, ten *B. flexner* and one *B. shiga* were isolated.

July.—120 specimens were collected in which the sweepers stated blood and mucus were present; fifty-seven contained sufficient mucus for examination and one was a large intestinal slough; twenty-nine were typical bacillary exudates and twenty-eight indefinite. *B. flexner* was isolated in eleven cases.

After July no further specimens were received, and as we considered we had obtained sufficient evidence of the presence of infective material supplied by the local population in the cantonment and had more work in the laboratory than could be dealt with, we did not press the matter.

Specimens had been received from over a large area in the cantonment and in considerable numbers. If it is realized that the specimens were collected by ignorant sweepers without any skilled supervision, the numbers actually received must have only been a fraction of those existing. Many of the specimens must have been lying for hours before they reached the laboratory. *B. flexner*, as was expected, was the dysentery organism isolated in greatest numbers.

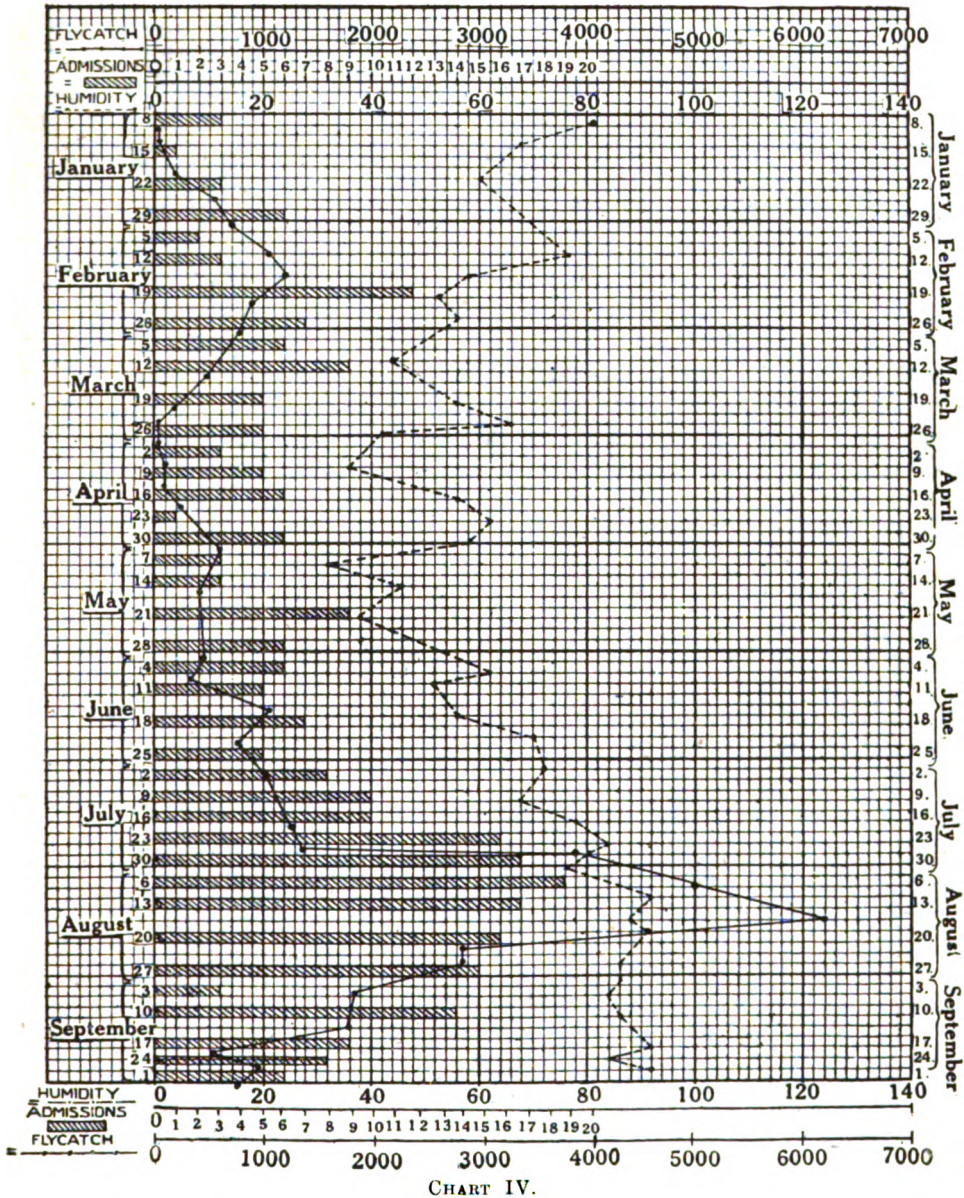
It appears to us very evident that latent bacillary dysentery is as great a danger in Poona as in Madras, and that there is an ample supply of *B. flexner* available for the fly to pass on.

Further evidence of the extent of the *flexner* or *shiga* infections among the troops, we thought might be gained from the serological examinations of individuals not suffering from dysentery, or from dysentery cases in the early stages, i.e., first or second day, before agglutinins caused by the attack of dysentery could have developed.

We commenced, therefore, in January examining as many individuals as possible on those lines. The blood-serum was put up against the five standard *B. flexner* strains, and *B. shiga* standard Oxford cultures. The lowest dilution of serum used was 1 to 25.

The results in brief were that 31·8 per cent British troops (average

service in India two to five years) and 50.6 per cent Indian troops contained in their serum agglutinins to one or all of the standard *Flexner* strains.



Flexner V appeared to be the predominant strain among both British and Indian troops.

Actual details of titres found, etc., are given in the laboratory notes at the end of this report.

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Among the 187 cases examined, on only three occasions were agglutinins to *B. shiga* standard culture found present in dilutions of 1 to 25 or over.

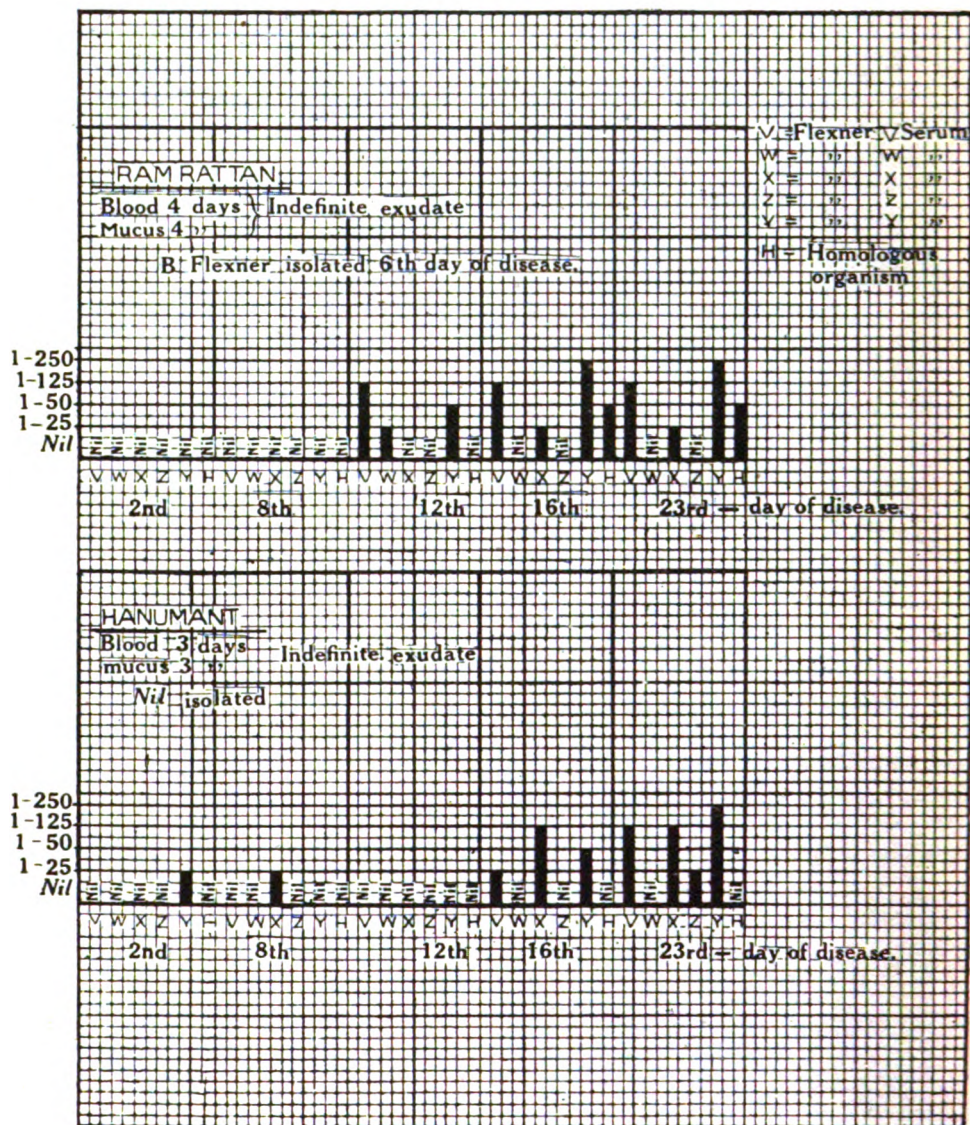


CHART V.

One, a European of many years' service in India, had been complaining for some time of abdominal discomfort with occasional passage of mucus. Unfortunately he refused to have any bacteriological examinations carried

out. The other two were Indians. Both had suffered from frequent attacks of dysentery, and in both cases *B. shiga* was isolated.

In view of these findings over a large number of examinations, it would appear worth while to consider the question of carrying out serological examinations in order to detect carriers of *B. shiga*. We expected to find a large proportion showing agglutinins in 1 to 25 or over, but except as noted above, none were found.

Possibly the use of other agglutination methods than Dreyer's may account for the accepted idea that agglutinins to *B. shiga* are present in a large number of healthy individuals in the tropics in a dilution of serum over 1 to 25.

That "contact infections" occurred apart from the agency of flies appeared to us to be proved by the frequency with which the mothers of children suffering from dysentery and treated in quarters, were infected while nursing their children. Many such cases occurred among families including those of the officers. If such cases can occur among individuals who understand the dangers of infection, and who are scrupulously clean, we can easily realize the ease with which the Indian servant passes on his infection. The fact that a little mucus is passed is too trivial an occurrence to merit any particular attention as regards increased cleanliness of the hands in these individuals.

SUMMARY AND CONCLUSIONS.

(1) Chlorination of the water supply in Poona is efficient. The water supply is not responsible for either dysentery or diarrhoea now endemic in the cantonment.

(2) There is a heavy infection among the Indian population in the cantonment of bacillary dysentery (*B. flexner*).

(3) This is passed by them to the European population and to each other by direct contact (hands, etc.), throughout the year.

(4) Flies are responsible for the large increase in these diseases during the monsoon period.

(5) The existing sanitary arrangements in Poona are absolutely ideal for the spread of bacillary dysentery.

In conclusion, we have to thank Major G. Wallace, O.B.E., R.A.M.C., for his notes on the sanitation of Poona, and for arranging and supervising the fly counts, etc.; Major Dowse, M.C., R.A.M.C., Major Pottinger, M.C., R.A.M.C., and Captain Aitchison, M.C., I.M.S., for giving us the benefit of their clinical observations, and also for the trouble they have taken to ensure that specimens from their cases were sent to the laboratory in such a manner as to give some chance of a positive isolation of the infective bacillus.

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(To be continued.)

SOME CLINICAL OBSERVATIONS ON THE FEBRILE DISEASES OF THE BALUCHISTAN PLATEAU.

BY MAJOR J. HEATLY-SPENCER, O.B.E.
Royal Army Medical Corps.

SITUATED at an average height of 5,000 feet above sea-level, the military districts of Baluchistan present an unusual variety of disease to the clinician whose task it is to unravel the sometimes difficult diagnostic tangles presented to him.

The geographical features of the country are those of an arid, mountainous and treeless waste of rocks. The valleys contain occasional streams, but water is so scarce that most elaborate precautions are taken by the native population to conserve what there is for the restricted cultivation which is possible in certain areas. The climatic conditions are peculiar. Very severe, dry cold from November to March is followed by a long hot weather, unbroken by any monsoon. When the latter has set in over the plains of India there are few stations in any part of India which show higher temperatures than those of Quetta. The diurnal variation is, however, great, often reaching twenty degrees in winter and over thirty-five in summer. The rainfall is about eight inches per annum and occurs chiefly between December and March—often with heavy snow blizzards. From March to December there is no rain except an occasional thunder-storm. Irrigation is necessary for the maintenance of civilized life, and irrigation is essential to the life cycles of the disease-bearing insects which are the vectors of many of the diseases met with. It follows that in such a climate ailments, both tropical and non-tropical, occur in great variety, and the clinician who here regards tropical disease as a water-tight compartment of medicine has much to unlearn.

Of the diseases endemic in the district the chief are malaria, the dysenteries, the enteric group, influenza, tuberculosis, jaundice, typhus, relapsing fever, the sand-fly group of fevers and the catarrhal group, including a high proportion of pneumonia. Considering that several of these overlap in seasonal incidence and many occur throughout the year, it will be readily understood that prompt and accurate diagnosis is apt to tax the resources of both physician and pathologist.

THE "SAND-FLY" GROUP OF FEVERS.

Responsible for considerable sickness and debility among the white population, "sand-fly fever" is a disease which calls for little skill in management but for much in correct diagnosis. At the present time the diagnosis of sand-fly fever is made to cover a multitude of minor fevers which cannot be referred to categories diagnosable by pathological findings,

yet which in many instances bear no resemblance to true pappataci fever. Phlebotomus fever occurs, with its usual symptoms, during the period when papatassii can be readily caught in any bungalow or barracks. It is not widespread and presents no features of interest. While there is no direct mortality, the writer has seen one case in which an apparently typical attack of phlebotomus fever was followed directly by a fatal malignant jaundice. In a second case, which was thought at first to be "sand-fly fever," the rapid onset of a transverse myelitis with a lesion of the sixth cranial nerve nucleus gave the clue to the real condition of encephalitis (transverse myelitic group of Gruchet and Verge). Sand-fly fever must of necessity be diagnosed from positive symptomatology, in conjunction with negative pathological findings for other diseases which may simulate it. The second attack of "sand-fly fever," which discloses *Plasmodium vivax* rings in the blood smear, is more than common.

ATYPICAL FEVERS AT PRESENT REFERRED TO THE SAND-FLY GROUP.

Apart from true phlebotomus fever, there are two clinical groups which at present are diagnosed as sand-fly fever but which should not be included under this head.

The first group embraces a large number of abortive fevers of obscure origin and of little clinical importance. There are perhaps one or, at the most, two days of raised temperature, some malaise and nothing more. There are no clinical signs and no pathological findings. One finds these ailments variously described with the names of the locality in which they occur, e.g., "Quetta fever." A proportion of these are undoubtedly malarial—latent malaria, which, in the presence of some extraneous factor which lowers general resistance, will sooner or later pass the clinical threshold and become diagnosable by pathological findings. The number of cases in which some definite malady will disclose a hitherto unsuspected and inactive malaria is great. The remainder of this clinical group are undiagnosable, but they are not necessarily phlebotomus fever, nor do they even resemble it.

The second group is of more importance and constitutes a group which is intermediate between sand-fly fever and seven-day fever, but which may ultimately prove to be referable to the latter category.

This fever is met with chiefly in the spring before mosquitoes are present and when sand-flies are with difficulty obtainable. Later, when mosquitoes and sand-flies swarm in the country, this disease is met with sporadically. The onset is sudden with severe frontal headache and lumbar pain. The temperature rises to 103° or to 105° F., and after one or two days shows either a short remission or a saddle curve as seen in some cases of dengue. It falls by lysis from the fifth to the eighth day, and frequently there is a small secondary rise two or three days later. The symptoms resemble in the main phlebotomus fever, in that severe frontal headache and lumbar pain are the outstanding features, but there are

important differences. There is no rash, no gastro-intestinal catarrh, no enlargement of the spleen or lymph glands. A mild pharyngitis and tracheitis is common, but rhinitis has never been observed. The pulse-ratio is normal or slightly slowed. There are no joint or long bone pains. A series of thirty-five cases of this fever occurred at Quetta in the spring of 1925, when no mosquitoes had appeared and only isolated specimens of sand-flies could be found. The main clinical signs and symptoms in this series were: (1) Headache and lumbar pain; (2) tracheitis; (3) occurrence of microscopic blood in scanty, viscid sputum; (4) conjunctival injection; (5) hæmoptysis (macroscopic); (6) pleurisy; (7) pleural effusion.

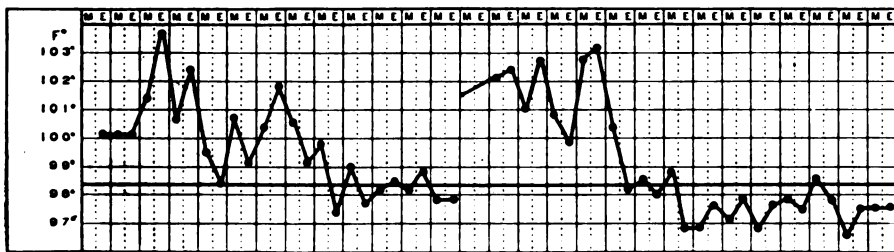


CHART A.

CHART B.

Intermediate type fevers.

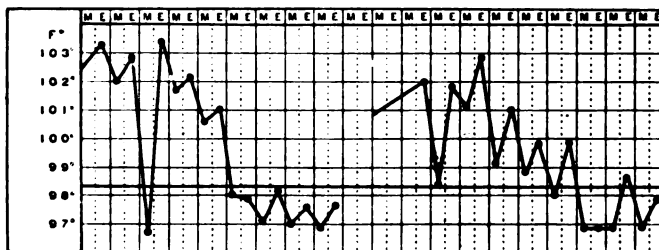


CHART C.

CHART D.

Intermediate type fevers.

Of these cases 28·5 per cent. showed the saddle type of chart. In the differential counts that were made a slight relative polymorphonuclear increase was noted. Blood-cultures proved entirely negative, and although some cultures of blood and urine into special media have been since made in fevers of this type, nothing has yet been isolated. All these cases were examined for malaria, relapsing fever and, where the fever lasted more than five days, for evidence of enteric group infection.

Here then is a group of fevers in which a temperature lasts for four to eight days—a fever which has no great resemblance to dengue (dengue fever, as far as is known, does not occur in the Baluchistan plateau). It differs markedly from phlebotomus fever. Nor is the clinical resemblance to seven-day fever at all complete, for there are no gastro-

intestinal symptoms, no rashes and no glandular enlargements. The disease appears to be analogous to seven-day fever but not identical with it in clinical manifestations—the difference may possibly be accounted for by factors associated with altitude and climatic variation. The presence of blood in the sputa proves nothing, but is perhaps suggestive (occurring in a high proportion of cases examined) that this disease may eventually be definitely proved to be of spironemal origin and analogous to, if not actually identical with, the fever due to *L. hebdomidis*. For purposes of illustration only, this disease is here referred to as “intermediate fever.”

In dealing with fevers of “sand-fly” type, some attempts have been made, in face of very great difficulties, to investigate them from the bacteriological standpoint. In the cases occurring in 1925, reported above, certain clinical features suggested the possibility of a spironema as the causal organism. The occurrence of blood in the bronchial secretion has a clinical analogy in the hæmorrhages of spironemal jaundice. Spironema were looked for and found in thirteen consecutive cases out of seventeen examined, but confirmation from the blood and urine was wanting, and therefore no importance attaches to these findings. In that year Wenyon-Noguchi medium of correct pH value could not be got in time; the year following no dark ground illuminator was available. If blood-infection occurs in these fevers it is most probably transient, lasting a few hours only, as in phlebotomus fever. It is to be remembered that these cases come along with others into a detained ward, where they must first be proved malaria negative before further investigation can be begun. In the stress of work in the hot weather, when hospitals are full and laboratories are already overworked, the chances of getting successful culture in a case where blood-infection is brief, and where research investigation involving special media and prolonged examination is required, are almost nil in the hands of the ordinary staff.

The writer would suggest that the proper investigation of these fevers should include: (1) Blood-culture into special media during the first few hours of the disease and prolonged incubation of these cultures; (2) the investigation of the urine from the seventh to the fourteenth day of disease by dark-ground illumination and by animal inoculation; (3) the injection of blood from early cases into volunteers, and similar early intraperitoneal injection of guinea-pigs.

Summarizing the above observations, it may be stated that:—

(i) A fever of from four to eight days' duration occurs in the Baluchistan plateau, which resembles Rogers' seven day fever, but which differs from it in the absence of rash, gastro-intestinal symptoms and glandular enlargements.

(ii) The disease is neither dengue nor phlebotomus fever.

(iii) It occurs chiefly in the spring, before the appearance of mosquitoes and when sand-flies (which later become very numerous) are difficult to find. Later in the hot weather it occurs sporadically.

(iv) There is a tendency to extravasation of blood in the bronchial secretions, and in the series of cases reported in which this occurred a high percentage showed the presence of a spironema in the secretions containing blood.

(v) The causal organism is undiscovered but may prove to be a spironema analogous to *L. hebdomidis*, and, if so, is possibly carried by the Baluchistan field mouse which invades human habitations.

(vi) Up to the present neither blood-culture early in the disease in special media, nor late examination of the urine, has demonstrated the presence of any organism in the comparatively few cases in which such measures were practicable.

THE DYSENTERY GROUPS.

In common with Manifold's [1] experience in the Poona district, it has now been clearly demonstrated that over seventy per cent of the dysenteries in Baluchistan are of bacillary origin. Bacillary dysentery is extremely common among children during the first five years of life and is a constant source of anxiety to the physician. The vast majority of the cases are of mild type, due to the Flexner group, and many would never be recognized but for the inflexible rule of examining bacteriologically every case of intestinal derangement in children. A preliminary report of the presence of a bacillary exudate in the stools serves to place the case on saline treatment and to withhold protein nourishment until a Shiga infection is excluded. Fortunately the latter infection is rare—when present it constitutes a grave danger to life in children.

The following brief summary of two cases serves to illustrate the striking contrast between Shiga and Flexner infections in children :—

Case 1, aged $2\frac{1}{2}$, contracted a moderate attack of diarrhoea with blood and mucus in the stools. Preliminary report: Bacillary exudate present. Saline treatment. Progress entirely satisfactory, and the case had considerably improved up to thirty-six hours from the onset, when *B. shiga* was isolated. Upon this the parents were advised to allow the child's admission to hospital. After much persuasion they consented, with reluctance, as the child appeared to be very much better in every way. Fatal collapse occurred four hours after admission.

Case 2, aged 5 (fully protected by bilivaccin a fortnight before), contracted a severe attack of clinical dysentery with high fever and frequent stools. *B. flexner* isolated. At no time did the clinical condition give rise to anxiety, and recovery was complete in fourteen days from onset.

Case 1 (Shiga) was clinically mild, but had been given albumin water by the parents. This danger has been drawn attention to by Acton and Knowles [2], who have demonstrated the production of a pressor exotoxin by *B. shiga* when protein nourishment is given. Early administration of polyvalent serum is the only rule to be followed, and this is always given,

if possible, on the report of a bacillary exudate in a case of clinical dysentery in a child. It is an almost universal custom among parents to give a young child with gastro-intestinal derangement albumin water, or diluted milk—and in the occasional case of Shiga infection, among very many due to the Flexner group, this may precipitate disaster. In adults the bacillary group presents no special features of interest. That peculiarly fatal combination of an acute bacillary dysentery imposed upon a recent attack of malignant tertian malaria (so commonly seen in Macedonia) is fortunately rare. As regards specific remedies, yatren 105 appears to be of distinct value, particularly in those chronic infections where the causal organism may not have been isolated, but in which agglutinins to one of the bacillary groups indicate that the case is dysenteric in origin. Bacillary dysentery is a very common disease in the hot weather in Baluchistan—it follows the appearance of flies in June, dies down in the hottest months, and again increases with the second wave of flies in the autumn. Only the strictest sanitary precautions serve to keep this disease within reasonable bounds, and any disturbance of the normal sanitary precautions would give rise to danger of a widespread epidemic of this disease.

Protozoal dysentery has been the object of much experimental therapy in recent years. Emetin, as a universal panacea for all ailments, of whatever nature, is still in use over far too great an area of India, in spite of the published warnings of competent observers. Those who have seen this drug used for the treatment of the terminal pleurisy and anasarca of chronic nephritis, or have seen it pushed to the production of cardiac failure in a doubtful case of amoebiasis, which does not get well, can fully appreciate what an immense amount of therapeutic damage is still being inflicted in India by the indiscriminate and prolonged use of this powerful poison to the myocardium. The writer has seen cardiac failure and death result from the repetition of an eighteen-grain course of this drug a few weeks after the initial treatment, and has also seen a heart gravely affected by fifty-six grains of this drug given at different places within a period of a year.

Amoebic hepatitis is common, but owing to the efficiency of some of the arsenical preparations introduced since the War, comparatively few cases now go on to suppuration. Early diagnosis is essential, for once pus formation has taken place no medical treatment will prevent ultimate surgical interference. It is in this disease, and in the onset of the continued fevers, that the malarial relapse becomes such a bugbear to the diagnostician. So many of these cases come sick with malarial parasites present in the blood (the attack being conditioned by the general lowering of tone), that the true state of affairs is masked until several valuable days may have elapsed—days whose loss may mean the missing of a diagnostic blood-culture in the enteric group, or the passing of the period in which medical treatment may arrest an amoebic hepatitis.

As regards the treatment of these hepatitis cases, emetin alone has now

been discarded by the writer. As a result of trial in this condition, emetin was found to be less rapid in therapeutic effect than stovarsol, and perhaps less certain in producing that effect. Using the total leucocyte count as an indicator of therapeutic results, it was found that under emetin alone this

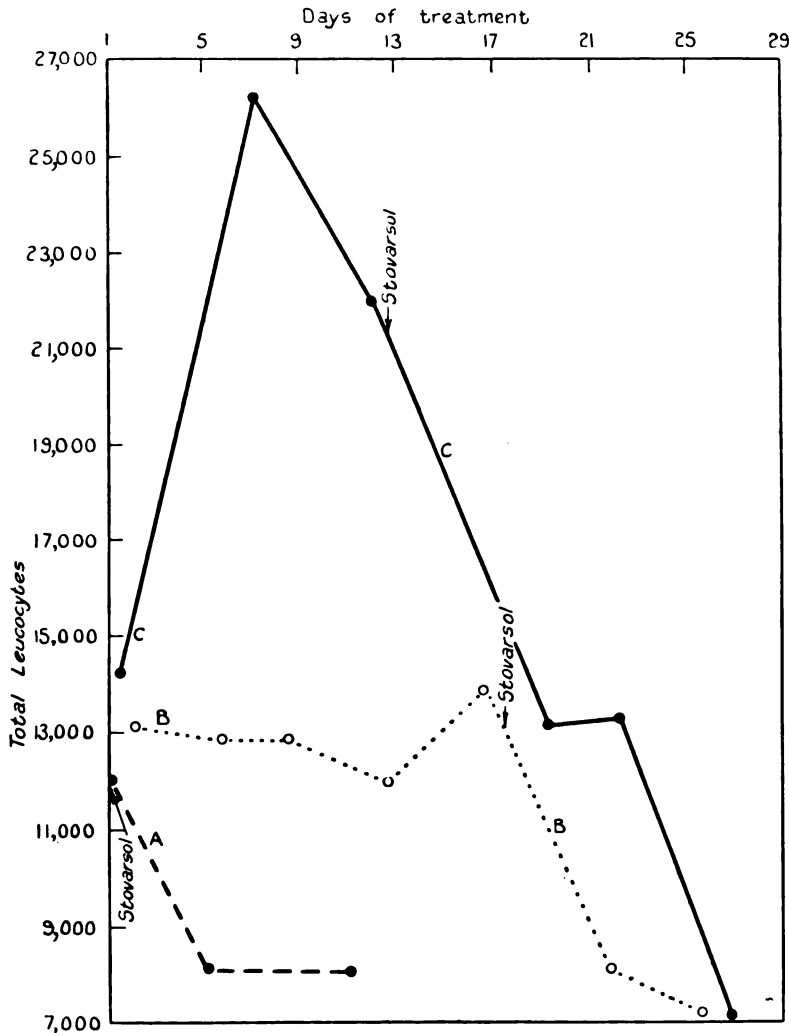


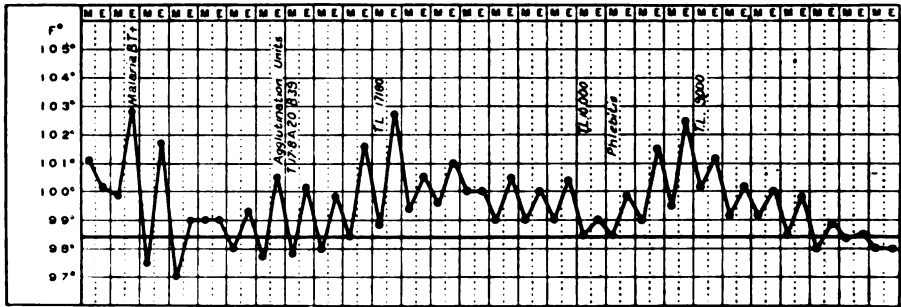
CHART J.—Leucocyte curves of three cases of amœbic hepatitis. A, treated by stovarsol from outset; B and C, treated by emetin salts followed by stovarsol where shown.

remained high for a longer period than under stovarsol. It is now the practice to give a strictly modified course of emetin by injection—up to six grains—in combination with stovarsol in a dose of twelve grains per day for twelve days. This is then stopped, and a further course given after a week's or longer interval. This treatment, provided pus formation has not

occurred, produces a striking and rapid amelioration in symptoms, and has been found to be most satisfactory in therapeutic results.

Chart J illustrates the graphs of total leucocytes in three cases :—

(A) A case of amoebic hepatitis treated by stovarsol alone—rapid fall in leucocyte curve.



6 days emetin 1 gr. = 6 gr.

7 days stovarsal 12 gr.=84 gr. ; 5 days 8 gr.=40 gr. Total 124 gr.

CHART K.—Malaria and amœbic hepatitis complicating paratyphoid B.

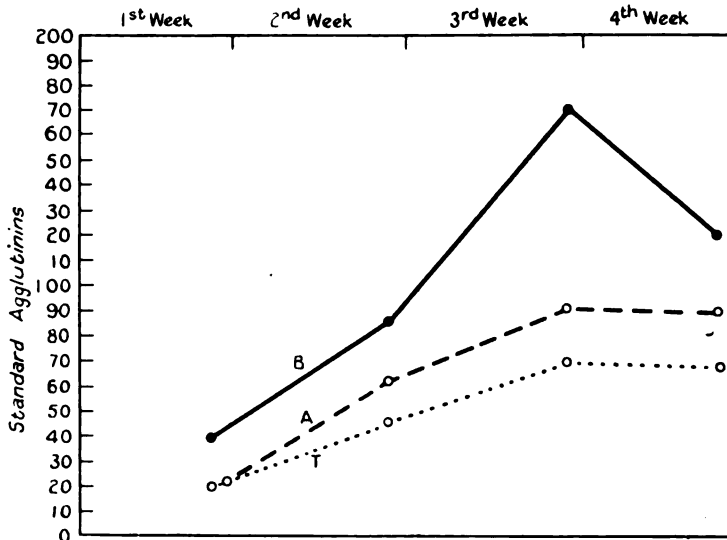


CHART K 1.—Agglutination curve of case of malaria with hepatitis and phlebitis (Chart K).

(B) Amoebic hepatitis. Fifteen days' treatment by emetin and emetin bismuth iodide, with no appreciable effect on leucocyte curve. Stovarsol then substituted with rapid effect.

(C) Amoebic hepatitis treated for thirteen days with emetin and emetin bismuth iodide, showing rise in leucocyte curve with rapid fall under subsequent stovarsol.

Chart K illustrates one of two cases of rather unusual interest.

Case A (illustrated) was one of hepatitis (with a definite history of amœbiasis) complicating a paratyphoid infection. The patient was sent in to hospital on the third day of illness, and found to have active benign tertian malaria (relapse), which diagnosis covered the clinical picture until the fifth day of observation, when the onset of pain in the region of the gall-bladder initiated an investigation for enteric group. The blood-culture was negative, and the liver symptoms rapidly increased. By the eleventh day of observation the liver was enlarged to percussion, generally tender, the right side of the diaphragm showed restricted movement under the screen, and the total leucocytes were 17,180. Treatment by emetin and stovarsol produced a rapid improvement in the clinical condition, and on the twenty-first day of disease the temperature reached normal, and the white count had fallen to 10,000. Meanwhile, the original agglutination to E group had shown nothing. Next day, the onset of a typical phlebitis in the left leg gave the clue to the real underlying disease. Although cultures of urine, blood and stools for E group were all negative in this case, a definite agglutination curve for *B. paratyphosus* B was obtained, and served to place the diagnosis within the enteric group and to explain the phlebitis. Under the stovarsol the liver symptoms subsided, but a report of bacillary exudate in the stools, accompanying some diarrhoea during convalescence, introduced another complication; this, however, cleared up under yatren 105, and the case made a perfect recovery.

Case B was somewhat similar on being admitted for the usual active benign tertian malaria (relapse). This merged into an attack of paratyphoid A. The organism was recovered and identified. Twelve days after admission he developed hepatitis and symptoms of pus formation rapidly ensued. He was operated on and eventually made a good recovery, in spite of contracting a severe attack of lobar pneumonia during his journey to the United Kingdom as an invalid.

These two cases raise some interesting points:—

- (1) Both had histories of amœbiasis.
- (2) Solitary abscess of liver due to *B. typhosus* is very rare, and no other case has been seen among the enterics observed in this district for the past four years.
- (3) In neither case could cysts of *E. histolytica* be found in the stools during the period under observation.
- (4) While in case A the liver signs began with an apparent attack of cholecystitis, which would account for the high leucocyte count—X-ray finding referred to above in conjunction with the rapid clinical improvement under specific anti-amœbic therapy leaves little doubt that the condition was a true amœbic hepatitis.

As regards the use of stovarsol in giardia infestations, several cases have been observed in which this drug has been of temporary benefit. It appears to arrest the diarrhoea, and cause the disappearance of giardia from

the stools for a time, but all the cases observed here relapsed on withdrawal of the drug. One early case of balantidium infection was, however, definitely cured by stovarsol, and this result, though isolated, is of importance.

THE CATARRHAL GROUP--INFLUENZA AND THE PNEUMONIAS.

Influenza, with its secondary catarrhal complications, is very prevalent in the cold weather. There is no doubt that the disease is introduced from Europe by new arrivals from overseas, who come straight up from the sea-ports. The prevalence of influenza has been twice noted to begin about two months after the disease has assumed epidemic proportions in Europe. In the perpetually dust-laden atmosphere of Baluchistan, chronic post-influenzal rhinitis and tracheitis are of very common occurrence, and prove most difficult to treat. Pneumonitis is common in the soldier, and is often mistaken for early pneumonia—it may be very puzzling in children giving few or no signs to aid the diagnosis.

Lobar pneumonia, either primary or secondary to influenza, is met with throughout the year. It is seldom, even in the hot weather, that a case is not under treatment in the military hospitals at Quetta. The death-rate in Europeans (under ten per cent) compares favourably with the general mortality in this disease. As is the general experience, the prognosis appears to depend largely upon the natural reaction to the disease, as indicated by the leucocytosis induced. Sodium nucleinate has been tried in many cases. It is doubtful if it is of any benefit in the case with slight reaction. In some cases (including other diseases than pneumonia) it appears to increase an already high leucocyte count. In others, where the natural leucocytic reaction is small and the prognosis proportionately bad, it appears to be of no clinical value. From observations during the past eighteen months the writer is of opinion that it is unreliable in action. In some cases showing a moderate leucocytosis of 12,000 to 15,000 per cubic mm., a definite increase has followed its use—in others no appreciable effect has been observed. It would appear that the production of antibodies in pneumonia may be indicated by a concomitant leucocytic reaction, but it by no means follows that the artificial production of a leucocytosis by sodium nucleinate is of any great value to the patient. It is a routine practice to give nucleinate to cases showing a low or moderate count; in the former it appears to have little effect; in the latter its action is uncertain. In the case with a high count it is unnecessary.

Abortive "pneumonia" (probably pneumonitis) is common—the cases show some early signs of commencing consolidation, but after two or three days the temperature falls and the disease aborts. These cases were observed before the advent of sodium nucleinate, and care must be exercised in attributing to this drug credit possibly due to nature.

The greatest success in treatment is still to be obtained by the careful increase of stimulation to combat the loss of vital capacity which, as has

been pointed out, reaches its maximum at the period of crisis. Oxygen and venesection are employed at an early stage in all serious cases, the whole scheme of treatment being planned so as to reach the critical period with a reserve of possible stimulation in hand to meet it.

The following cases are illustrative of the above opinions :—

Case 1, aged 42, subject of chronic valvular disease (mitral regurgitation-pure), lobar pneumonia, right lower lobe. Natural leucocytic reaction 20,000 per cubic mm. ; typical crisis on seventh day. Recovery complete—clinical condition at no time serious.

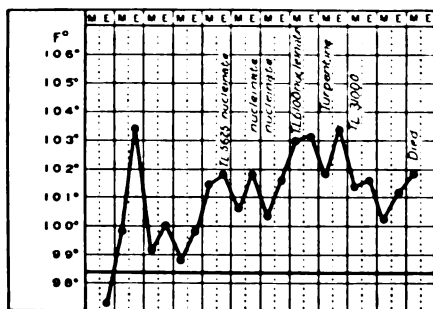


CHART L.—Lobar pneumonia.

Case 2 (chart produced), aged 21, healthy. Lobar pneumonia right lower and middle lobes. Natural leucocytic reaction nil (5,500). After four days of sodium nucleinate injections, count had risen to 6,100 per cubic mm. Extension to left lower lobe. This patient's condition was desperate for many days on end, and finally the leucocyte count was raised by turpentine on the ninth day to 31,000 per cubic mm., with no clinical improvement. Died on twelfth day of disease.

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THE PUBLIC HEALTH SERVICE.

BY LIEUTENANT-COLONEL J. G. McNAUGHT.

Royal Army Medical Corps (retired).

THE appearance of an article on "Private Practice," in the January number of the R.A.M.C. NEWS AND GAZETTE, has suggested to me that possibly a few notes on the Public Health Service might be of use to officers who are thinking of retiring and taking up work in civil life. A fair number of retired officers of the R.A.M.C. have obtained posts in the Public Health Service in recent years; there are on the roll of the Society of Medical Officers of Health the names of some twenty-four ex-service medical officers who hold civil appointments, and of these seventeen are retired R.A.M.C. officers. I would advise anyone contemplating resigning from the Service to think the matter over very carefully before coming to a decision. The Army has very great advantages which perhaps are not fully appreciated while one is serving, still in many cases questions of health and family reasons make it advisable to return to civil life. To those to whom private practice does not appeal, and who possess, or have an early prospect of obtaining, the Diploma in Public Health, the Public Health Service offers an opening. It can hardly be said to be a Service in the same sense as the Army Medical Service, as there is no uniform scale of pay, certain prospect of promotion, or assured pension. Of late years some advance has been made in securing a fixed rate of pay, and in the more important counties and municipalities superannuation schemes have been adopted, but promotion is uncertain and only obtained by applying for a higher post.

The scope of public health work has been greatly altered in the past ten or fifteen years, and now includes school medical inspection, tuberculosis, the treatment of venereal disease, the special examination and supervision of mental defectives, and ante-natal and infant welfare work. In consequence of this extension of the sphere of the Public Health Department, the number of assistant medical officers has been greatly increased, while the number of senior posts has remained much as before. As a result of this, promotion is slow and competition for senior posts very severe.

The salary of an assistant medical officer starts at £600 a year, with travelling expenses, and in the more desirable areas there are regular increases up to £750. Senior posts carry salaries of from £800 to £1,500 or more, but the competition is keen, and unless an assistant medical officer secures a senior post of some kind before he reaches 40 years of age, his prospects are very poor.

In some areas the assistant medical officers carry out all the various duties in their district, while in others the duties are more or less specialized, tuberculosis work being carried out by certain officers, venereal disease work by others, and school medical inspection and infant welfare work by others.

Officers retiring from the R.A.M.C. who think of taking up public health

work fall into two classes, those who retire with a gratuity and those who retire on pension. The prospects in the two classes are quite different. An officer retiring with a gratuity is still young enough to start a fresh career with some prospect of getting to the top of the tree; in the case of the older officer an occupation in life, and a salary which, added to his pension, will enable him to live in comfort and educate his family, if he has one, is as much as he can hope for. In the case of the young officer, it is above all things necessary that he should possess the D.P.H., or become possessed of it, before trying to obtain an appointment. If he already has a D.P.H., I should strongly advise his spending six months or so on post-graduate work in London or some other large centre. He should, in particular, make himself acquainted with the running of tuberculosis dispensaries and infant welfare centres, and get an insight into school medical work. In addition, post-graduate work in diseases of the chest, venereal diseases and the diseases of children will repay the time spent on it. If the officer does not possess the D.P.H., he will have to pursue the course of study for this diploma under the new regulations, which provide for instruction in tuberculosis, infant welfare, etc. At the close of this period of post-graduate study, the officer should apply for any vacancy which he thinks may suit him. His aim, if he hopes to rise in the Service, should be to get as wide an experience as possible. It is a mistake to remain too long in any one appointment. Once a footing is obtained, the next objective should be to obtain a post in an area giving an opportunity of studying administration. For this purpose one of the large towns gives the widest training, and an assistant medical officer holding a post in such a town as Liverpool or Birmingham has a good prospect of attaining a senior post in due time.

An officer retiring on pension has but a poor chance of obtaining a post in the Public Health Service at the present time. This is due to the fact that the great majority of appointments are only open to men under 40 years of age, and that there is no difficulty in getting plenty of well-qualified applicants under this age. The stiffening up of the D.P.H. course and the diminished entry of medical students may alter this state of things in the remote future, but for some time to come the chances of men over 40 will be very poor.

An age limit is not so strictly insisted on for those taking up a special appointment as a tuberculosis officer, or a V.D. officer. A medical officer who is fond of clinical work, and who has specialized in either of these subjects, should have a fair chance of obtaining an appointment in one or other of these departments.

There are also occasionally vacancies for appointments as medical officers of health of combined sanitary districts, and a senior officer with a D.P.H. and some experience as a sanitarian would have a chance of obtaining such a post. I consider the experience gained as a sanitary officer in the Army very valuable in dealing with the problems of sanitation in a rural district. It is likely that in the near future there will be a greater demand for whole-time medical officers of health of combined districts.

Editorial.

REPORT OF THE MEDICAL RESEARCH COUNCIL FOR THE YEAR 1926-27.

THE year under review has been remarkable for the development of the relationship of research work supported by the Council in the United Kingdom with similar work in the Empire overseas.

At the meeting of the Imperial Conference, the organization of research work in different parts of the Empire was an important subject for discussion. The report of the Research Sub-Committee of the Conference was adopted, and as a result there has been a steady linking up of research organizations in Great Britain with similar organizations in India and the Dominions. The Secretary of State for the Colonies has appointed a Colonial Medical Research Committee, which will advise the Secretary of State and the Medical Research Council upon the initiation and promotion of medical research in the interests of the Colonial Empire.

It is coming to be recognized that Tropical Diseases, though they may have certain peculiarities of their own, do not stand absolutely apart in the field of medicine, and are often linked up with other diseases and conditions which are now being investigated in temperate climates. The part played by deficiency diseases in lowering the resistance of a population is now established, and these studies, combined with researches in biochemistry and studies of filtrable viruses, are likely to be of considerable assistance in elucidating disease in the tropics.

In the space at our disposal we cannot hope to deal with all the research work carried out under the auspices of the Council; the mere enumeration of the subjects would be wearisome. There are, however, certain investigations which we think will be of particular interest to the officers of the Corps.

During the war, Sir Thomas Lewis carried on research connected with the disorders of the heart and blood vascular system among the military forces, and the results of his investigations, and the studies of the after history of cases which are still being carried out, will be of permanent value to the Army. Recently, Sir Thomas Lewis has published a monograph on the blood-vessels of the human skin and their responses, in which he has put together the studies on the capillary blood-vessels carried on throughout the whole period. In 1917, he showed that the walls of the capillary vessels have an independent power of changing their calibre, and in the monograph he comes to the conclusion that all forms of injury to the skin act by causing the liberation of a substance akin to histamine, which produces the reddening and other familiar signs of skin irritation.

In 1827, Bright published an account of the clinical conditions associated with kidney disease, which he had observed at Guy's Hospital, and just 100 years later, Dr. Oman, working also in Guy's, has published results obtained by the application of modern methods of bio-chemistry to the investigation of kidney disease, which seem to promise successful treatment of inflammation of the kidney following scarlet fever. Though at present scarlet fever is manifesting itself in a particularly mild form, yet the incidence of kidney disease after it does not appear to be diminished, and remains a more serious menace than scarlet fever itself. Last year, the Council reported that Dr. Oman had been able to determine by simple tests which cases of kidney disease were likely to be followed by nephritis, and showed that treatment with alkalis would prevent its onset in these cases.

This finding has been confirmed by trials on a large scale at one of the fever hospitals, and Dr. Oman's methods have reduced the incidence of nephritis and albuminuria after scarlet fever from 5.5 per cent in a control group of untreated cases to 0.6 per cent in 620 treated cases which received alkalis by the mouth throughout the illness.

Among the investigations of which summaries are given in the Report, the Council state that the most dramatic in its course and results, and probably the most important in its immediate practical results, is that of Rosenheim and Webster, who have succeeded in producing vitamin D by the action of ultra-violet rays upon a sterol.

It is now acknowledged that vitamin D is the factor in food of which deficiency causes the symptoms seen so strikingly in rickets. Its deficiency also prevents the proper development of the structure and hardness of the teeth and interferes with the functions of muscle.

The discovery that rickets is a deficiency disease due to the absence of a vitamin soluble in fat, found in the common animal fats, but not in vegetable oils, was made by Mellanby working for the Medical Research Committee, and was announced in the Report for 1916-17. It was at first uncertain whether this substance was something other than vitamin A, but this was definitely established by McCallum and his co-workers who distinguished it by the name of vitamin D.

In 1919 the Medical Research Council sent a mission to Vienna which, using the clinical material and laboratory facilities provided by Professor Pirquet at the Children's Hospital, was able to confirm Mellanby's conclusion and showed that his experimental results, gained chiefly by the use of puppies, were applicable to man: that rickets was a disease due to fat-soluble vitamin deficiency and was counteracted by the effects of summer sunshine upon the children.

While the mission was at work in Vienna, Huldshinsky of Berlin observed that irradiation of the bodies of children suffering from rickets by means of a quartz mercury lamp cured the disease. This discovery was confirmed by the mission in Vienna. In 1921 it was shown by Hess and Meyer that a similar effect could be obtained by exposure to the direct rays

of the sun. The curative effect of exposure to the rays from either ultra-violet lamps, or from the sun, are due to certain rays present in the ultra-violet portion of the spectrum; the maximum antirachitic tendency is possessed by rays of 302 millimicrons in wave length; the most effective rays of the sun are those which range from 290 to 313 millimicrons; these short wave-lengths are readily cut off by smoke, dust, and moisture of the atmosphere, and are thus markedly reduced in winter and also in early morning and late afternoon when they have to pass through a thicker layer of the atmosphere than at noon when the sun is high in the heavens. Brown and Tisdall found that the sun's rays in Toronto had in April and in May eight times the antirachitic effect that they had in December, January and February. The antirachitic effect of skyshine (skyshine means reflected rays from the sky and clouds) is about half to two-thirds of that produced by sunshine, that is to say the rays from the sun plus reflected rays from the sky. Sunshine which has passed through special glass such as "Vita" glass has considerable antirachitic effect, hence the use of this glass is justified when inclement weather prevents the direct exposure of patients to sunshine.

In America, Professor Steenbock showed that many types of food on irradiation yielded the antirachitic vitamin. Researchers in America following up Mellanby's work found that vitamin A, the absence of which produced stunting in growth and eye changes, was *not* produced by irradiation of foodstuffs.

Rosenheim and Webster in England, Hess, Weinstock and Helman, and Steenbock and Black in the United States, working independently, found that cholesterol having the characteristics then known of the pure substance was rendered antirachitic by exposure to ultra-violet rays.

In the last annual report of the Council it was stated that "Dr. Rosenheim and Mr. Webster had obtained evidence that not cholesterol itself, but some closely related substance, inseparable from it by ordinary methods of purification, is the parent of the essential vitamin."

In 1926, Rosenheim and Webster showed that cholesterol when further purified by a chemical method had lost the property of becoming antirachitic on irradiation. The purified cholesterol no longer possessed the absorption spectrum in the ultra-violet region which is characteristic for cholesterol purified by physical means only.

As early as 1925 it had been suggested by Steenbock and Black, and Schlutz and Morse, that an impurity in cholesterol might be the causative factor in its activation by ultra-violet light, the latter two observers basing their view on spectroscopic observation only. But Rosenheim and Webster first established by animal experiments that the absence of absorption bands in the ultra-violet region coincided with the loss by cholesterol of its property of becoming antirachitic on irradiation.

In the search for the nature of provitamin, Rosenheim and Webster collaborated with Professor Windaus. They showed that, unlike the

vitamin obtained from it, provitamin forms an addition compound with digitonin, is destroyed by oxidation and by bromine. The sensitiveness of provitamin to oxidation processes is characteristic of only one of the known sterols, i.e. ergosterol ($C_{27}H_{42}O$), which is also destroyed by bromine and forms an insoluble digitonide. These facts suggested to Professor Windaus that the provitamin might be ergosterol, and at his suggestion Rosenheim and Webster took up again the study of ergosterol, which they had previously found, after irradiation, to be highly protective even in doses of one milligramme. They found the characteristic bands of absorption were identical with those of cholesterol, but 1,500 to 2,000 times as strong. As the result of irradiation the absorption bands disappeared, just as in the case of cholesterol, and the product could not be precipitated by digitonin. If provitamin were ergosterol, the amount present in ordinary cholesterol would be about 1 in 2,000, and irradiated ergosterol should possess antirachitic activity in correspondingly small doses. These assumptions were confirmed by biological tests, and $\frac{1}{10000}$ milligramme of ergosterol was found to cure and prevent rickets in rats kept on a rachitogenic diet.

There is now no doubt that ergosterol or some closely allied unknown sterol is the substance which clings in small quantities to other sterols and is the source of the vitamin formed when these natural sterols are irradiated.

Ultra-violet radiation not only forms the vitamin from ergosterol but destroys it when formed, and efforts are now being made to find the region of the spectrum in which the formative outweighs the destructive action.

Hess, Weinstock and Helman showed that lanolin contains the precursor of vitamin D and suggested that it is by the activation of the cholesterol in the layers of the epidermis and its subsequent absorption that animals are protected from rickets.

Miss Hume and Miss Henderson Smith, and Dr. N. S. Lucas have proved that inunction of irradiated cholesterol into the skin of rabbits and rats fed on a rickets producing diet, prevents rickets, and this evidence seems to support Hess's suggestion that the preventive and curative effects of sunlight on rickets are actually due to the natural production in, and absorption from, the skin of the same substance, the D vitamin.

These investigations just described have an important bearing on the nation's food supply and it seems that we now have at our disposal abundant and cheap supplies of the antirachitic vitamin D. New studies have also been made of the distribution of the vitamin A. Rosenheim and Webster have found that the proportion of this vitamin present in some liver fats may far exceed that found in cod-liver oil, hitherto believed to be the richest source of the vitamin. The liver oil of the salmon and halibut, and the liver fats of birds like grouse and the goose, have been shown to be extremely rich in this vitamin, and Rosenheim and Webster have found that the liver fats of the sheep, calf, and ox contain ten times as much vitamin A as a good cod-liver oil. The vitamin A content of butter varies

considerably according to circumstances; sheep or ox-liver fat contains 200 to 1,000 times more vitamin A than a good average sample of butter. It appears that the total supply of milk fat is inadequate for the minimal needs of the population. But our national needs of vitamin A can be met by the addition of vitamin A from liver fat to the diet, either with butter or margarine or in other ways. The home supply can be supplemented by Empire produce, as it has been found that the vitamin content of fat from imported New Zealand liver is the same as that from the liver of home-killed animals. These fats extracted from liver are wholly free from the unpleasant flavour of fish oils, and the low melting point of liver fats aids their incorporation with other fatty food materials. The problem of the supply of vitamin D is now easily solved; its amount in milk and butter varies according to the diet and environment of the cow, but there is no longer any necessity to search among natural products for vitamin D since we can produce it artificially by irradiation of ergosterol. It has been shown that human rickets can be cured by a daily dose of two milligrammes of this substance.

Dr. S. S. Silva has continued his chemical investigation of the anti-scorbutic factor (vitamin C) and has given much attention to the improvement of the methods for isolating this vitamin and to the relation to its anti-scorbutic activity of the reducing substances accompanying the vitamin. He has obtained evidence which indicates that these substances aid the stability of the vitamin. He has also found that the stability of active preparations of lemon juice is greatly diminished by heating even under strictly anaerobic conditions, although the anti-scorbutic properties are not altered.

Duplicate samples of lemon juice prepared by Dr. Silva for the S.S. "William Scoresby" Arctic Expedition have been examined after twelve months' storage and no loss of activity has been detected.

Dr. Silva, in conjunction with Captain J. Golding and Miss Soames, has investigated the relative values of vitamin A and vitamin D of butter from cows fed on diets supplemented with green fodder and cod-liver oil. It has been found that by adding cod-liver oil to the diet of the cow the butter gains greatly in vitamin D and vitamin A; cows receiving green fodder show improvement only in vitamin A content.

In 1915, McCollum and Davis came to the conclusion that a water-soluble accessory food factor B was necessary in diet in addition to the fat-soluble vitamin already discovered by them, and as the results of their experiments McCollum and Kennedy thought that this factor was identical with the antineuritic vitamin of Eijkman, and that the specific degeneration of the nerve-cells was due to a lack of water-soluble B. Evidence against the identity of water-soluble vitamin B with the antineuritic vitamin has been accumulating, and the experiments of Goldberger and his colleagues, and of Chick and Roscoe, indicate that the water-soluble vitamin B of McCollum and Kennedy contains at least two

constituents, i.e., the antineuritic (or antiberiberi) vitamin identical with that discovered by Eijkman in 1897, and a vitamin identical with the pellagra-preventive or P.P. factor of Goldberger. Both vitamins are necessary for growth and health, and are present in yeast and in all known food substances containing the water-soluble B vitamin. The P.P. factor is much the more thermo-stable and resists a temperature of 120° C. for four hours, which destroys the antineuritic vitamin.

Chick and Roscoe suggest that the term vitamin B should be confined to the second water-soluble vitamin, the P.P. factor of Goldberger. Plimmer, however, pleads for the retention of the term vitamin B for the antineuritic factor. He says it would be simpler to leave the term vitamin B for the antineuritic substance with which it has long been associated and give the term P.P. factor to the unknown substance in yeast and other foods which prevents pellagra and maintains bodyweight.

The Committee on Nutritional Problems of the American Public Health Association recognize that vitamin B contains two active parts and suggest that F should be used for the antineuritic factor so closely associated with the name of Funk, and G for the factor which Goldberger believes will prevent pellagra. The Committee would retain the term vitamin B for the whole complex which may contain other factors.

Professor Drummond has extended his work on the physiological action of vitamin B. He believes that all the abnormalities attributed to vitamin B deficiency can be due solely to the loss of appetite and resulting inanition that follow the withdrawal of the vitamin.

The only clear-cut symptom directly attributable to vitamin B deficiency would seem to be the polyneuritic or "beri-beri" condition, showing head retraction and convulsions. With Dr. A. H. Woolard he has shown that the degeneration of the peripheral nerves that has been regarded in the past as specifically due to vitamin B deficiency is only another result of inanition, and occurs in general starvation, even when ample supplies of the vitamin are present.

Recent research by Plimmer and others appears to indicate that there is a definite relation between the quantity of vitamin B required and the quantity of protein, fat and carbohydrate consumed. Children taking cod-liver oil ought to be given a substance rich in vitamin B at the same time. The ratio between the amount of food consumed and the amount of food containing vitamin B has been worked out for chickens, pigeons and rats. There are no experimental data for man, but calculations based on the diets of Japanese troops which caused beri-beri during the siege of Port Arthur, and on the diets of our soldiers at Gallipoli, suggest a ratio of 1:10 to 1:24. For safety the higher figure should be taken.

According to Plimmer, one of the chief functions of vitamin B is to repair cell nuclei, and all the substances so far isolated as vitamin B appear to belong to the group of nucleic acids. He thinks it is not necessary to balance every meal so long as the whole day's food is properly balanced.

Besides the vitamins, modern studies of nutritional science are indicating the value of inorganic elements or their salts. The Council state that "vitamin actions are found to be related in vital ways to subtle factors of balance between them, and again between them and other factors in diet." Qualitative problems of all these kinds are linked with the quantitative problems of nutrition, and last year the Council appointed a small representative Nutrition Committee to bring under review all these different lines of study. The committee are attempting to frame, in co-operation with agricultural interests, a chemo-geographical survey of the inorganic constituents of diet available in different parts of the country and their relation to the distribution of disorders in health, human or animal. The committee are also investigating the factors to be rightly used in referring quantitative dietetic estimates to a single man-power standard by due allowance for age and sex. It is believed that the factors at present used in calculations of dietetic investigations of this and other countries under-value the requirements of children, and that the standard accepted for the actual energy requirements of the adult is probably too high.

Another important question for a nation, whether at war or at peace, is the biological value of food taken in excess of the actual needs of the body as judged by the energy expenditure. This question loomed large during the Great War when owing to the loss of supply ships by enemy submarine action it became necessary to cut down the food supply of our soldiers to the bare minimum indicated by the energy requirements of the soldiers' work in war. To military hygienists a certain "luxus" consumption has always appeared desirable so that there might be a reserve in the body to meet sudden calls of extra work, or temporary failure in the supply of food, and also to keep up the *moral* and bodily resistance to disease. The Council state that they cannot hope to contribute effectively to the solutions of these problems without extended resources of their own and the co-operative effort of other interests.

The success of the insulin treatment of diabetes has led to the search for artificial substances having a similar type of action. One of these, a synthetically prepared diguanidylnonane, has been introduced in Germany under the name of "synthalin." Dr. Bodo and Mr. Marks have succeeded in showing that synthalin resembles insulin in accelerating the disappearance of glucose from the blood circulation, but it produces its effects by a process which fundamentally differs from that of insulin.

The Council state that a monograph on the results of war nephritis is being prepared for publication. The Ministry of Pensions have given facilities for following the after-histories of patients who contracted nephritis during the war and more than 10,000 of these cases have been followed for eight to ten years and their subsequent history determined. One of the most striking results is the comparative frequency with which the original kidney trouble has cleared up, leaving behind, however, cardio-vascular impairments with high blood-pressure.

Dr. Stanley Griffiths has completed his studies of tuberculous infections in domestic animals and his results show the bovine bacillus is the chief cause of tuberculosis in these. Avian bacilli, however, can be transmitted to mammals, and in a series of 100 pigs investigated by Dr. Griffiths the avian tubercle bacillus was found in more than thirty per cent, and in another series of twenty-seven Cambridge pigs in which the visible lesions were confined to the glands of the alimentary tract avian tubercle bacilli were also present in a third of the number. The human tubercle bacillus plays little part in the causation of tuberculosis of domestic animals, the dog excepted, but is a not infrequent cause of general tuberculosis in wild animals kept in captivity.

Dr. Griffiths has examined five cases of tubercular meningitis in children and four of these were found to be due to the bovine bacillus.

The Tuberculin Committee has forwarded to the Council a unanimous resolution thoroughly deprecating the suggestion that children get benefit from milk containing bovine tubercle bacilli by obtaining some immunity against tuberculosis. The committee consider that a method of random and uncontrolled immunization carrying with it grave risks of producing serious or fatal disease is quite indefensible.



Clinical and other Notes.

NOTE ON THE PREPARATION OF DRIED COMPLEMENT.

BY PROFESSOR W. J. TULLOCH, M.D.

From the Department of Bacteriology, University College, Dundee.

FOR the past three years the routine Wassermann tests in this laboratory have been conducted using dried complement prepared sufficient at a time for performing 1,500 to 2,000 tests. On each occasion that tests are carried out a control of the same positive serum is used. The control serum is obtained in bulk (forty cubic centimetres), is inactivated and dried, being redissolved when required. This control is set up over a wide range of dilutions each time tests are performed, and must give the same degree of fixation on each occasion. By thus using the same complement and the same positive control over prolonged periods, comparable results can be obtained. This procedure, controlled by clinical observation at the Venereal Diseases Centre of the City of Dundee, has proved of great value and, were it not for the loss of activity which occurs when complement is dried, would be worth introducing as a routine method in all laboratories where Wassermann tests are carried out.

In preparing dried complement the serum from a number of guinea-pigs, sufficient to ensure that an "average" complement is obtained, is dealt with at one time.

There is, however, one serious drawback to the procedure, namely, that the process of drying does, to some extent, reduce the complementary activity of the guinea-pig serum, and occasionally a batch is encountered which, owing to this loss being excessive, is not suitable for routine use. As a batch may represent the serum of from twenty-five to fifty guinea-pigs, this means a considerable loss, as the product must be rejected if it be below a certain standard of activity.

Moreover, the depression of activity consequent upon drying the complement, even if it is not so marked as to result in rejection, does increase the cost of the final product, so that any modification of technique which reduces this loss would be invaluable.

Some time ago a large batch of dried material had to be rejected by us because of its not being of the required standard, and this rejected material was made the subject of investigation, with a view to determining the cause of its unexpected deterioration. It was found that the addition of euglobulin, as was almost to be expected, restored the activity of this product. It therefore appeared that the deterioration of complement which occurred on drying the reagent was due mainly to alteration in the euglobulin fraction.

Work that is at present proceeding in this laboratory on another subject indicates that the change produced by agitation of protein suspensions, either by shaking or bubbling, is a reaction occurring at the interface between fluid and gas. In drying complement by the method of Hartley, Eagleton, and Okell, there is bound to be a considerable amount of frothing, and although this occurs in a highly rarified atmosphere, it seemed possible that, nevertheless, this had an effect akin to that produced by shaking the complement. Schmidt (1913) has shown that it is the globulin fraction which is susceptible to agitation, and that that fraction can be to some extent protected by the addition of hypertonic salt to the serum, an observation which accounts for the preservative action which hypertonic salt exerts on stored complement in the fluid state—Kolmer, Matsunami, and Trist (1919). It also indicates why hypertonic salt permits complement to pass through bacterial filters—Muir and Browning (1909).

It would therefore seem that hypertonic salt stabilizes complement by inhibiting deterioration mainly of the globulin fraction, and, in view of this, the technique of Hartley, Eagleton, and Okell has been modified thus: To the complement to be dried is added sufficient salt (chemically pure NaCl is used) to make the concentration of salt equal to 9.9 per cent, and the material is then dried by the Hartley, Eagleton, and Okell method, and weighed to obtain data for dilution. The product so obtained is diluted with distilled water to 1 in 12. As 0.5 gramme of the salt-complement mixture represents approximately 3.3 cubic centimetres of original complement, this quantity would be dissolved in 39.3 cubic centimetres distilled water.

This diluted complement is tested out for activity and deviability in the ordinary way.

The procedure is now used as a routine in this laboratory, and has given satisfaction in that complement thus dried is almost as active as the fresh serum, but some time must elapse before the keeping qualities of the product can be determined.

This note is published in the hope that others interested in the storage of complement may further investigate and elaborate the technique which can, at least, be regarded as promising.

NOTES ON COCAINE.

By SERJEANT-MAJOR E. B. BROWNE,
Royal Army Medical Corps.

THE coca plant (*Erythroxylon coca*), originally called by the Indians "cuca," is native to South America. Whilst it is now cultivated in many parts of South America, West Indies, Ceylon, Java and elsewhere, the plant was probably originally indigenous to Peru and Bolivia.

Early explorers found coca widely used among the Incas and other American races, and it was referred to by De la Velga and many others

with descriptions of its effects. From time immemorial it was used in religious ceremonies and was held more or less sacred. The leaves of this plant were offered to the sun god by the Aztecs and Incas, and during various religious ceremonies the priests were required to chew coca leaves. Captives and victims, prior to sacrifice, were given the leaves.

Apart from its religious uses the drug was very widely used by Indians of all classes, particularly by labourers and the poor. Whilst engaged in hard labour they were able, through chewing coca leaves, to perform prodigious feats of strength and to fast for days.

Erythroxylon coca is a shrub, or bush, which grows from six to eight feet high. Its leaves are lively green, oval and rather thin. They have an aerolated centre marked off by two distinct longitudinal lines. When dried the leaves are greyish-green, and exude a tea-like odour. If chewed they make the tongue pleasantly warm; a sensation which is followed by numbness. The shrub has small yellowish white flowers with five petals, which grow in small clusters. These fructify into red berries. The plants are widely cultivated and begin to bear marketable leaves when about eighteen months old, and may continue to bear for forty years. They are seeded in small beds and transferred when about a foot high. They require a warm, damp climate, and the leaves are harvested thrice yearly—March, June and October—the first being the largest. The leaves are spread out on heavy cotton cloths to dry in the sun, and are then packed ready for shipment to France, Germany, Austria, Japan and the U.S.A., to be made into cocaine.

The workmen employed on the plantations cease work regularly about four times daily for coca chewing. They chew the dry leaves with the addition of a small quantity of unslaked lime, which latter aids in extracting the active principle. The method is much the same as used in the Far East amongst the chewers of betel-nut, and has the same disastrous effect upon the teeth of the addicts. The result of the chewing is initial tingling of the tongue followed by numbness and partial anæsthesia, with complete loss of taste and impairment of sense of smell.

All pain or uneasiness of the stomach is relieved and all sense of hunger disappears. Whilst addicts can fast quite cheerfully they lose weight and become emaciated; and a cessation of supply often leads to complete collapse. Although less powerful than cocaine, the leaves produce, in excessive chewers, similar symptoms—wasting and emaciation, gastro-intestinal disturbances, mental aberration followed frequently by mild dementia with fantastic sense hallucinations caused by disorders of sensation. They imagine that insects, the so-called "cocaine bugs," are crawling over their bodies; disorders of the nose and sense of taste cause fanciful bad odours and taste, and so on, and the victims are disconnectedly talkative and subject to causeless fits of excitement.

Cocaine, marketed almost exclusively in the form of cocaine hydrochloride, is the active principle of *Erythroxylon coca*. It is an alkaloid,

first isolated many years ago, which has been in general use for about forty years. The hydrochloride appears in colourless, transparent crystals or white crystalline powder, odourless, with a faintly bitter taste. It is chiefly used as a local anæsthetic, having no effect on the unbroken skin but being absorbed readily by the mucous membrane, producing complete anæsthesia. The sensory nerve endings are paralysed so that neither pain, heat nor cold is perceived and the sense of touch is lost.

As the serious dangers attending its uses became more widely known it was less enthusiastically used and, with the coming of novocain and other local anæsthetics, it is now rarely used.

The history of the cocaine habit and the abuses to which the drug is put is that of all the other alkaloidal drug habits; the doctors began it. Here was a new and beneficial drug; it relieved pain. Enthusiastic doctors snatched at it; countless suffering patients begged for it; it was widely administered. Small blame to the doctors—their chief aim is to relieve pain and they are dependent upon the best available means.

The old-time treatment of nasal catarrh by spraying with a weak solution of cocaine started a trail that led to cocaine sniffing.

In moderate doses, cocaine is said to “greatly increase the bodily and mental power, and give a sense of calm and happiness, with the abolition of bodily and mental fatigue. It produces a sense of peace and well-being.” It undoubtedly does increase the capacity for sustained mental and physical effort, and it does all these things without producing any very serious or detrimental after-effects.

In moderate doses! There is the catch!

It is impossible to continue for long to take cocaine in moderate doses. Morphinists have been known to take moderate doses of their drug regularly even for periods up to fifty years—never sufficient to produce objective symptoms of intoxication—keeping their habits secret for all that time and retaining the respect of their acquaintances. But not cocainists. The habit grows so surely and quickly that the addicts will commit the most daring, fantastic and bizarre, revolting and callous crimes to ensure their supply. A few moments after a dose has been sniffed or injected there is a sense of elation, of power, of ability to accomplish and a complete abolition of ordinary inhibitions. All sense of fear, timidity, shame or pity is lost. All unpleasant sensations are gone; thirst, hunger and cold are forgotten, muscular powers are increased and the addict becomes a super-man.

Early addicts will talk continuously for hours and, if of good mentality, very interestingly. As they go on, however, increasing the dosage, cocaine deterioration sets in, they become incoherent and disconnected, rambling and disjointed. They reach a stage where they cannot work or sleep without cocaine, and they develop an idiosyncrasy for the drug that demands larger and larger doses. The stage of stimulation is followed by depression and lassitude, during which accumulated effects of exhaustion and hunger

manifest themselves. The addict becomes dull, sullen and morose, and inclined to outbursts of ungovernable fury.

He goes downhill, mentally and physically, with alarming rapidity, only to wind up in a lunatic asylum or charity hospital and then—the potter's field.

They die very hard deaths—despite their anæmic, emaciated condition they cling desperately to life—struggling hideously to live, and will often continue to breathe long after a normal individual would have died peacefully.

Amongst addicts and in criminal slang, cocaine is variously called “coke,” “foolish powder” and most commonly “snow.” Cocainists are “cokeys” or “snow birds.” The drug is irregularly sold in small folded papers containing one sniff. It is almost always adulterated with sugar of milk, talc or other harmless substance, and sometimes with unslaked lime.

Travel.

KULTUR AND KUR IN A COUPÉ.

By U. P. A.

(Continued from p. 381.)

A Chakkar.—Next morning we started to explore Southern Würtemberg, Hohenzollern and Upper Schwabia.

“What,” you say, “all in one day?”

Yes: because Hohenzollern is in south Würtemberg, and south Würtemberg is in Upper Schwabia.

The busiest man in Germany must be the Minister for Fatherland Nomenclature.

Markdorrff stands at the entrance to the foothills of the Schwabian Mountains. Here the coupé picked up a nail; a lucky puncture, for no sooner were we in the shelter of a garage than the rain came down in torrents.

The owner of the garage was a middle-aged man possessed of a splendid physique, a knowledge of America, three sons and a daughter. He had been a stoker on the Hamburg-Amerika Line, and still kept up a newspaper acquaintanceship with the New World. I felt nervous when I saw that his favourite news sheet was a Christian Scientist publication: you can't mend a puncture on Faith. However, while he explained to us all about baseball and Mrs. Eddy, his boys made a good job of the tyre, and the daughter polished the coupé's bright parts: charge, one mark. I added a second for the youngsters' benefit, and we departed in a shower of thanks and aufwiedersehens.

We lunched on eggs, brown bread, butter and beer in the bar-parlour

of the Gasthaus Zum Krone—the best hotel in Markdorff. Our arrival created a sensation. The landlady was nonplussed and her clients—a very bucolic collection—were dumbfounded. Georgina's *sang froid*, backed up by my honest appetite, gradually dispelled their astonishment and, I hope, compelled their admiration.

A handsome cockatoo was perched on the railings in front of an ancient tower. He gave us an amusing lesson in parrot-German. The rain did not seem to worry him at all.

The coupé climbed through woods and vineyards, passed out of the wet belt into brilliant sunshine and entered the old town of Ravensburg. This place contains some fine mediæval buildings and is dominated by the ninth-century Veitsburg Castle, the ancestral house of the Guelphs.

From here is a short run to Weingarten, another delightful old place. It shelters under a big Benedictine monastery, to which is attached a pilgrimage church. Externally and internally the church is a splendid example of ecclesiastical decorative work. It possesses the sacred relic of the Holy Blood, in connexion with which a famous procession takes place every year, on the day following Ascension.

Fields of corn filled the valleys: vines covered the slopes of the hills and great patches of forest clothed the heights.

Good roads, alternating sunshine and shadow, and a fresh breeze combined to bless the journey.

Villages and hamlets were picturesque and full of colour, and the peasant folk greeted us with cheery smiles and salutations as the coupé flashed by. Georgina-at-the-wheel always caused a perfect epidemic of hat-doffing which, when the coupé was running slowly, was, I think, accentuated by my republican tie. As a matter of fact, it was an innocent regimental tie; but the red-gold-navy blue was so like Fritz's red-gold-black, that he may be forgiven for mistaking me for an enthusiastic partisan of the Reich. Nor, on discovering my real identity, did he ever seem to bear me any ill-will.

In this matter of national emblems, and in view of what one reads in the newspapers, Fritz's attitude is most puzzling. You will find a town or village hidden under a canopy of republican flags; another smothered in the old flags of the monarchy; others bright with the colours of Baden, Württemberg, Hohenzollern or Bavaria as the case may be. More common is it to find a riotous mixture of all sorts.

We had no opportunity of discovering for ourselves the opinions of professional politicians and soldiers; but apart from their views, it appeared to us that in Germany flags are just flags.

The provincial flag satisfies local pride; the monarchical standard supplies a touch of sentiment; the republican emblem makes a fine splash.

So far as we could judge, the average man is quite content with the present régime, but, as he would say, ALL the flags of the Fatherland are good to look upon. Hoist up the lot!

We left Altshausen and Ostrach behind and pulled up in a grassy glade in the middle of a forest of giant pines. We were hungry. Appetite transformed the bread, cheese and beer into a regal banquet.

A little, fat, red-faced man, bearing a big rucksack and pushing a cycle, toiled up the hill.

With an elaborate flourish he raised his Homburg from off his perspiring, bald head, and bowed.

We exchanged the customary greetings and, as that exhausted my conversational German, he turned to Georgina and said, "May I inquire where you are going, madam?"

"Hither and thither, wherever the spirit moves."

"Himmel! On the bummel? I, too, am a bumbler. Do you like it?"

"It is altogether delightful: we love it."

"Ach! So?" The little man fairly boiled over with excitement and pleasure. "Ach! So? That is very good, splendid, admirable! Ya. Have you seen Sigmaringen?"

No: we had not.

There followed a description of Sigmaringen by a red-hot enthusiast. The little man spread his maps and showed us the route. His sincere appreciation of the beauties of his native land and his animated manner carried us away.

"Then you will go?"

"Yes—and now," answered Georgina, decisively.

The little man was delighted. He mounted his bike and we parted with many expressions of mutual goodwill.

But they were all like that. When they found you were British, that you were sight-seeing and that you considered Germany a beautiful country, no trouble was too much for them to take on your behalf. Hence, we never made any arrangements in advance, for the wayside bumbler, the hotel proprietor and the policeman were our guidebooks from day to day. From them you learn of the best roads, the most picturesque places and most comfortable hotels, and they are all map-reading experts.

We passed through Pfullendorf and then over a first-class road, through miles of great deer-parks and forests into Sigmaringen, the ancestral home of the Hohenzollerns.

This is an attractive little town. Below it the Danube flows through a pastoral valley which is broken on the right bank by a huge, rocky bluff. This majestic feature is crowned by the Hohenzollern Castle—an enchanting building. Surely it is the very castle in which The Sleeping Beauty awaited her Prince's magic kiss.

In his estimate of Sigmaringen the little fat man was right.

Back to the Lake and Forest.—The coupé climbed out of the valley to about 2,200 feet and sped southwards over the rolling hills.

At Messkirch, away on the left, a great monastery on a ridge was outlined against the evening sky.

At Wald a mediæval schloss guarded the road.

A long, steep hill into Überlingen on the Bodensee ended the day's run: mileage, 102.

At the hotel we were looked after by a waiter who understood English perfectly but who could not, or would not, speak it. He was most attentive, foresaw our every want and was an adept in supplying the little things that matter. His motto was "British home comforts first!" Another ex-P.O.W., I am sure.

After dinner we sat in the hotel garden—which ran down to the shore of the lake—and watched the western sky change through a wonderful series of colours, until the moon rose and flooded land and water in a silvery sheen.

Presently a uniformed brass band arrived for the bi-weekly Kur Konzert. We retired: but it, and the crowd, kept us awake for a long time. Mozart—*Don Juan*, I think—finished me. Georgina survived that and was eventually hypnotized by a Waldteufel waltz.

It was not a bad band—but it was not a good one.

Route on July 23:—

Ludwigshaven, at northern end of the Überlinger See.

Across country, on a wretched road, to the shore of the Zeller See, skirting Radolfzell: height, 1,200 feet.

Via Singen, Hilzingen and Blumenfeld to Thengen,* seventeen miles from Radolfzell; height 1,960 feet.

To Weizen (1,420 feet)—thirteen miles.

To Bonndorf* (2,600 feet)—ten miles.

Thence by Glasshutte to Dresselbüch*—five miles.

Finally, into Schluchsee (2,900 feet)—one mile. Total distance, seventy-two miles.

Passes have to be negotiated at the places marked with an asterisk.

Twice, on difficult stretches of road, we were headed off by "Strasse Gesperret."

Once we were chased by a swarm of angry wasps.

On the summit of the Thengen Pass we were stopped by a couple of German motorists whose car had run out of petrol. We went back to Blumenfeld and fetched a tin.

Fritz and Hans were so full of gratitude that they forgot to pay.

This drive was hard on the coupé: bad going, steep gradients and a hot, sultry day. But the scenery was varied and beautiful, and the views from the hilltops were superb.

Nevertheless—and although the car behaved splendidly—the next time we visit Schluchsee by motor we will take the circular road via Lenzkirch: the route which we followed was fit only for bumblers on foot.

Arrived at the hotel, mine host made inquiries of his men before he would believe that we had travelled by Glasshutte and Dresselbüch.

The old porter was quite proud of our feat. In former days he had been employed in Queen Victoria's residence at Monaco.

In the evening a trio of bumblers—a girl and two youths—in the Bavarian mountaineers' dress, gave a concert consisting of folk songs, dances and zither playing. It was an excellent show: so good that I think the artistes must have been professionals.

During one of the items the elder lad improvised verses in which various members of the audience were chaffed in a good-natured way. Attention was drawn to the fact that the top of my head is as innocent of hair as a well polished plate.

The audience cheered.

We spent the morning of July 24 cleaning and overhauling the coupé.

Before we could get at her a big German touring car had to be moved out of the shed. This car got out of control, ran down a steep bank, and crashed into a heavy farm wagon. Fortunately the latter stood firm as, otherwise, there was nothing to stop the tourer from careering down the mountain side and being dashed to pieces on the rocks 300, or more, feet below.

German cars are powerful and well-built, but they are heavy, clumsy and ugly.

Our coupé was an unfailing attraction to Fritz, who has nothing like the graceful, high efficiency, British light car. He would say: "Rolls-Royce, hein?" and then proceed to a minute examination of everything. Motor experts were particularly appreciative and inquisitive, and used to fill their notebooks with as many details as time would permit; but the absence of the Rolls-Royce name-plate worried them. It seems that, in Germany, a good British car *must* be a Rolls-Royce.

We rambled through the woods. As we were approaching an open glade I noticed a flash of brown in the green undergrowth. I clutched Georgina's wrist and we stood stock still. A deer walked into the glade, surveyed the scene, nosed about for a bit, lay down and slept! It is extraordinary that the animal neither saw nor scented us, for we were only a few yards away.

Despite the fascination of it all we could not stand immovable forever; we tiptoed forward, the deer leaped to its feet, watched us for full fifteen seconds and, with a graceful bound, disappeared.

On several occasions we saw deer on the roads; generally in the morning or evening, when silently winding downhill through the forests.

It was a pretty sight to come suddenly on these graceful animals; they never seem to gauge the speed of the car and you are close on them before they clear the wall or ditch and dash to cover.

Next morning mine host—a merry, plump little person—sped us with, "Officier anglais? Bon! C'est réclame pour la maison."

French was never spoken until I had failed to understand their German and they had failed to make themselves understood in English.

The road descended steeply to the lake, a beautiful sheet of water enclosed by fine mountains.

The neighbourhood of Schluchsee is the best part of the Southern Schwarzwald: except for the absence of heather it resembles the wilder tracts of the Scottish Highlands.

Via the Blasiwald and Schwarzhalden Valley we reached St. Blasien where, in the ninth century, St. Blasius founded a Benedictine monastery. The present Renaissance church has a fine cupola which, however, is out of harmony with the surrounding fir-clad hills.

The town stands at 2,400 feet. It is a popular Kur resort and noted for winter sports.

A new motor road has been opened down the left bank of the Alb to the Rhine. It is like parts of the Jhelum Valley road; cut on the faces of perpendicular cliffs, threaded through numerous rock-tunnels and, on the off-side, bounded by a low wall which, if you drive with care, prevents you from dropping into the torrent which bubbles and boils many feet below.

At Albrück the coupé was turned west, up the right bank of the Rhine.

The Rhine, from Bingen to Coblenz, with its numerous ruined schlosses, picturesque villages and such features as the Pfalz and Lorelei, is justly famed in picture, song and story.

It is the haunt of the tourist and the mainstay of propaganda.

But for natural riverain beauty it cannot compare with the stretch along the Swiss border from Waldshut to Rheinfelden.

Passing through Klein and Lautenberg we arrived at Säckingen. The town was *en fête* and we were held up by a procession consisting of all the fire brigades for miles around.

This seems to be the season of the year for holding fire-fighting competitions; they were in progress all over South Germany.

Most of the firemen wear medals and decorations which probably were not all earned in peace time. The brigades move in military formation with bands playing and banners flying.

In connection with these competitions athletic sports, including Association football, are arranged by the local clubs. The members of these clubs also conduct operations in military fashion.

Even the spectators and officials (frock coats and silk hats) march in fours to music and with flags flying!

This sort of thing leaves an uneasy feeling at the back of one's mind. To the democratic Britisher it seems to be the reverse of pacific; not at all in the spirit of Locarno. But after being wedged a dozen times in a crowd of processionists; after being recognized by everybody as an "Engländer"; after being shepherded, told what all the fuss is about, and waved cheerily on our way, it is hard to believe that the inward meaning and purpose of this show of militarism is *La Revanche*.

If a free-born Briton wants to amuse himself in the open air, he looks on at a football match.

If a Scandinavian wishes to enjoy himself, he joins some of his fellow men and indulges in Swedish gymnastics.

But if Fritz is in a holiday mood he gets a brass band, hoists a banner and parades. He can't help it; he is made that way.

There is compensation in bad roads and severe gradients; they are not popular with motorists. Hence we were not troubled with much motor traffic; in this respect the roads resemble those of England in 1913.

But one result of this is that benzin and benzol are often difficult to get. In Germany it is a safe plan to fill the tank whenever you meet a reliable supply. The stuff served out in emergencies in the smaller villages is nearly always low-grade, and quite unsuitable for high-efficiency cars when hill climbing has to be done.

From the valley of the Rhine the coupé was turned north up the Wehr Valley through Schopfheim, Schönau and Zell, to Todtnau in the Wiesental: a run of sixty-four miles.

No wonder so many hotels and guesthouses in Germany bear the legend, "zum Ochsen"! As in India, cattle are more numerous, and of more importance, than horses. Where we employ draught horses in the field and on the road the Germans employ cattle and, as often as not, cows in milk. To us this seemed wasteful and not altogether humane; but an amateur is ill-fitted for criticizing the astute and hard-working farmer Fritz.

Another surprising thing is that over the length and breadth of the land you never see the cattle grazing in the open. This gives the countryside a curious, deserted aspect. The British system of pasturage is not practised and, until you are right on the Swiss border, the only cattle visible are those employed in heavy traction.

Next morning we called at the post office to collect our first mail since leaving Wiesbaden.

The Reichpost officials behaved in the same way as an aggravating postal babu in Hindustan, i.e., they displayed the mentality and powers of resistance of a budmash mule.

Had they said, "You cannot possibly be the villainous people whose photographs are affixed to your passports," we should have left it at that; but they did not; they knew something of the vagaries of the passport photographer. What they did say was, "We know you are the people you declare you are, but—you have not complied with this, nor with that; it is verboten to do this; it is also verboten not to do that," and so on.

We filled up innumerable forms—in quadruplicate—and, after a vexatious delay, dourness on my part, powerfully backed up by feminine guile on Georgina's, triumphed.

From Todtnau, 2,160 feet, the road descends gently to about 2,000 feet and climbs to the Feldberg, 5,000 feet, the highest point in the Black Forest.

The road is narrow, treeless, and on the sunny side of the hill. It has a bad surface. Hairpin bends are frequent. The gradient is continuous,

but degrees of steepness vary : average 1 in $10\frac{1}{2}$ over a distance of six miles. The lumber traffic causes numerous checks. The coupé received harsh treatment and yet, when we topped the summit, she was in splendid fettle.

Now it was midsummer and the car was not fitted with a fan. I pulled up and did a stupid and dangerous thing. I unscrewed the radiator cap in a careless, absent-minded manner. Instantly a great jet of boiling water—a fountain from a high-pressure geyser—blew the cap into the air and just missed my face by an inch.

That taught me a lesson.

The effects of rapid changes in altitude mystified us at first. In addition to the alteration in boiling point, there are alterations in tyre pressure. Thus, you start the day's run with your tyre gauge at twenty-one pounds. It is disconcerting to find that, after covering ninety miles, the gauge registers twenty-five pounds. We carried a Steward's pocket barometer. In the morning the reading might agree with the weather, "Set fair"; but in the evening, in the midst of a howling storm, the reading was sure to be "Fine and sunny."

The Feldberg affords a number of magnificent views. The descent from "The Roof of the Schwarzwald" is over a good, well-wooded road, and the gradient is fairly easy.

Note : If you wish to drive to the top of the Feldberg, approach it from the north-east, i.e., from Titisee and not—as we did—from Todtnau.

Titisee is a pretty place, famed for its winter sports ; height, 3,000 feet.

Thence via Neustadt and Vohrenbach through a timbered and pastoral valley, well-watered and green, and containing neat little farmhouses, fragrant lumber mills, and picturesque hamlets.

Furtwangen combines industry with Kur. Its houses, hotels and factories are dotted over a beautiful, pine-covered hill side. It must be a healthy spot.

A climb of four or five miles took us on to a barren hilltop. At 3,350 feet the coupé surmounted the watershed and passed through Schönwald—a bare, windswept place. From here the road descends 1,020 feet in five and a half miles, to Triberg.

Triberg is a renowned Kur resort. It is built on both sides of the road at one of the steepest parts ; the height varies from 3,290 to 2,300 feet.

In a deep gorge nearby is the famous Gutach Waterfall, which in seven cascades falls through a height of 540 feet. Leaving Sommerau and St. Georgen behind, the coupé ascended a nasty gradient through splendid pine forests, and then descended into a valley whose beauties cannot be described in prose. As I am not a poet, I must leave it with the remark that it was the most delightful part of the Black Forest that we saw throughout the tour. It led to Schramberg, a town surrounded by lofty heights and ruined castles.

Another severe climb ! A fast run over the downs and, at the end of

eighty miles, we enter Rottweil on the Neckar—a place of much historical and architectural interest.

In the evening Georgina gave the waiter the usual warning regarding raw onions.

This appeared to be a source of interest and amusement to a German family seated at another table.

Fritz and Gertrud conversed hurriedly in undertones and dispatched Fritz, junior, aged about nine, to clarify the onion warning.

Fritz, junior, gave the waiter explicit instructions about the raw onions, and in the most frank and polite manner possible, informed us that he spoke German, English and Spanish.

He did not speak—or, at least, did not admit to French.

For a long time he entertained us with an intelligent account of the country he had just left : Mexico.

He went off to bed in great glee with an armful of English illustrated papers.

Some day that boy will become a professor. Of what? Oh! of anything. . . .

The morning of July 27 broke dull and threatening.

The garage where we filled up with benzin-benzol was owned by a brawny, upstanding fellow. On discovering that we were English, he plunged into the usual yarns about the Great War. Here is one of them :—

“In 1917 I was a Flying Corps officer on the Somme. We brought down a British aeroplane. The pilot, who was unhurt, was duly interrogated. Our Intelligence Officer said : ‘In the end you will lose the war, and you know it. Why not admit it now?’”

“‘Lose the war!’ the Englishman replied : ‘We have a saying in England which I have no doubt you will remember one fine day; it is this—*he laughs best who laughs last!*’”

“I have never forgotten that incident.” He waved us a cheery farewell as we drove towards the fast gathering storm.

Through Schomberg and Balingen we approached Hechingen. Heavy grey-black clouds shrouded the mountains. Suddenly a rift appeared, and a broad shaft of sunlight struck full on a conical peak on which was perched a fairy castle from out of an old-fashioned pantomime.

The Hohenzollern Burg stands at a height of 2,600 feet, and 1,050 feet above the surrounding country. Although it only dates from 1850-56, it is designed after the style of a fourteenth-century stronghold. Graceful spires and slender towers rise above the encircling battlements and, at a distance, the building has all the appearance of a genuine mediæval fortress of importance.

The storm burst in Hechingen. We took shelter while the rain descended in sheets, and water flowed over the roadway in a torrent. In half an hour it was over, and we had a pleasant drive between forest-clad ranges from the valley of the Starzel to Tübingen, a distance of forty miles.

A violinist is a creature of sympathy and understanding.

He strode down the street a slim, æsthetic-looking figure clad in black, and carrying his instrument case under his arm.

He acknowledged our greeting with a flourish of his broad brimmed felt hat and said: "English, to be sure! then I know just where you would wish to go"—and he directed us to an excellent old-world hostelry situated in a charming old-world market place.

This square is bounded by ancient buildings, including a fine rathaus erected in 1435. Nearby is a most interesting Gothic collegiate church and academical buildings of picturesque design and colour. The whole forms an effective frame for the statue of Tübingen's most famous citizen, the poet Uhland.

From here quaint streets and alleys radiate in all directions.

It is easy to confine your wanderings to the old town if you are so minded, and not endowed with a sensitive nose. But the Tübingen mediæval bouquet is particularly potent: some of the odours must be as ancient as the drains and cesspools.

It is a relief to the nose to climb to the schloss, built by Duke Ulrich in 1535. This is a grand example of a feudal stronghold. The main gateway is of unusual design: massive and menacing. The views from the battlements are splendid.

Tübingen is the seat of one of Germany's oldest universities, founded in 1477.

Some day, when Georgina carries out her vow to make Tübingen her sketching headquarters, I shall take a post-graduate course there.

I will not, however, wear a rainbow-coloured cap and cross-belt; nor will I qualify for the Sticking Plaster Club.

Judging from the number of students whose faces are criss-crossed with snowy white strips of plaster, Tübingen must be a most aggressive spot.

The German 'varsity student is not an attractive person. Compared with his British prototype he is terribly serious, rather a hobbledehoy and, I suspect, something of a prig.

A course of Rugby football would do him a lot of good.

Culture.—For a period of two weeks we had been strangers to the flesh-pots of civilization, so, on July 28, we decided to visit Stuttgart, thirty-five miles away. Like veritable country cousins, we fell to this sort of thing:—

"If we were to question a hundred globe-trotters and ask them what rank, in their opinion, Stuttgart occupies among the beautiful cities of the world, we may be quite sure that they would be unanimous in classifying it among the first twenty."

If Georgina and I were included in the hundred globe-trotters, opinion would not be unanimous: there would be at least two dissenters.

Our enjoyment of the scenery on the Tübingen—Stuttgart road was

marred by the bad going. A worn surface was often a sign of the vicinity of a big town: the bigger the town, the bigger the pot-holes.

Outside Waldenbuch the coupé nearly collided with a stag. We came on him at a corner. He seemed to be petrified by our sudden appearance. The sound of the horn brought him to his senses and he cleared the boundary wall just in the nick of time.

The hotel at which we stayed was big, efficient, luxurious and cosmopolitan: a replica of any hotel de luxe, in any town of importance anywhere.

We did not enjoy its amenities. We had become too heavily infected with the virus of vagabondage—and it did not cater for bummblers.

Stuttgart is the capital of Würtemberg. It is a commercial and industrial centre, progressive and hustling, and contains 350,000 inhabitants.

The old town dates from 1229. Picturesque bits of it still remain, notably the castle (1553) with its beautiful arcades, and a market-place with some fine old buildings.

The latter are in striking contrast to the splendid, new, Gothic-style rathaus.

Compare the ultra-modern railway station, to which the guide-books give pride of place. This building faces up the main street, which is long and straight, and so it can be seen afar off; in fact you cannot get away from it.

Were it a state prison erected for the express purpose of deterring the citizens from qualifying for entry, then one could understand the design. But by the bones of St. Nicholas, I understand it not. It is brutal. It is hideous. It is a nightmare.

At present, German art is impregnated with advanced modernism. This modernism is neither fatuous, as in England—nor subtly delicate, as in France. It has a character of its own, revealing the Teuton at his worst: in all his grossness, naked and unashamed; and not content with defacing shop windows and picture galleries, it spreads itself in huge, leprous patches over the walls of buildings, whereon in former times mural decoration of a charming and appropriate kind was displayed.

No: we are not amused by this manifestation of Kultur.

In Stuttgart there are many imposing public buildings, fine squares, monuments, statuary, etc.—mostly modern. But the ensemble is neither impressive nor restful. Everything seems to be subordinated to the exigencies of high-pressure civilization, including a much advertised American exposition.

Somewhat disappointed, and very tired, we crept into the garden of a boulevard café, ordered "five o'clock" and asked the waiter to recommend a cake. He advised peach cake with cream, for which, he said, the café was famed.

In due course we were seated each before a minute piece of peach cake and a mountain of very sweet whipped cream.

Georgina demolished one quarter of her portion, and I half of mine. We departed more than satisfied.

The waiter sniffed.

That evening we voted on "the most beautiful of Germany's large towns" versus the Open Road.

The latter won by two votes to nil.

We decided to leave Stuttgart on the morrow, July 29.

Three Treasure Houses.—These are Schwabische Halle, Rothenburg and Nuremberg. They must be seen to be believed. In any case they are described fully in all the guide-books; and here it is proposed merely to relate our personal experiences and impressions.

Of Rothenburg it is said that it is the only place regarding which the staid Baedeker employs the superlative.

We travelled to Halle via Waiblingen, Backnang, Sulzbach, Mannhardt and the Löwenstein Hills; thence to Rothenburg by Kirchberg and the Haller-Hohenlohe uplands: a run of sixty-five miles.

Road surfaces are none too good, but the scenery is varied and attractive.

Halle is surrounded by old walls and turrets from which fine views may be had of the Roher Valley.

When we were exploring the battlements a company of young bumblers—senior pupils of a mixed school—arrived with packs, flags and a band—violins, mandolins and guitars.

They lined up and listened to an address by the master-in-charge. Then the band played a few opening bars and the whole party sang an old German folk song.

They trooped off in fours to the strains of a stirring march.

As we looked at the big, cumbersome rucksacks and the heavy, hob-nailed boots, we marvelled at the stamina of the youthful Gertrud. No Eton crop, Charleston nonsense about that hefty young woman!

The surroundings of Kirchberg are beautiful. The village itself occupies a position not unlike Tret on the Rawalpindi-Murree road.

"It can be justly claimed for Rothenburg that, in the words of a poet, 'the clock of Time has stopped here.'"

This is no exaggeration. Early mediæval history whispers to you from out the worn woodwork and the hoary stones. A town in which to dream—in which to breathe the air of chivalry and romance.

Our little tumble-down hotel lay in the shadow of the Marksturm. The coupé occupied one half of the scullery: there are no orthodox garages in Rothenburg.

The town is completely surrounded by a high wall guarded by thirty-three towers, and pierced by six main gates with flanking towers.

It contains 9 churches, 2 rathouses, 2 museums, 12 hotels of sorts, 5 restaurants, 5 breweries, many wine saloons and beer cellars, 2 perambulator

factories and several Kur baths. A formidable list to place against a population of 8,500. However, the floating population of globe-trotters, bumblers and artists is a big one.

Our first visit to Rothenburg took place on a Whit Monday, when the festival play, "Meistertrunk," is performed.

This play was written by a glazier, Hörber, and has been enacted in the Kaisersaal of the old rathaus since 1881.

Actors and actresses are townspeople, and the drama is in the first rank of German folk plays.

The scene is laid in the Thirty Years' War, when Rothenburg espoused the cause of the Swedes, and was besieged and captured by Tilly. It was decided to plunder the town and to execute the members of the Council. However, the old Burgomeister, Nusch, saved his beloved city by fulfilling Tilly's stipulation—that he should empty the Ehrenpokal (the Goblet of Honour) at a single draught.

The goblet had a capacity of thirteen Bavarian pints.

We left on August 2 and travelled via Colmburg, through some of the finest forests in central Franconia, to Ansbach on the Rezat, once the residence of the Margraves of Brandenburg-Onalzbach.

This town is a mixture of Gothic, Baroque and Rococo.

The Chapel of the Knights of the Swan is of great interest. The altar dates from 1484, and there is a superb painting by Hans Baldung Grien. Curiously enough there are no swans to be seen, but each of the beautifully-modelled figures of the knights is supported by a big dog.

Continuing through forest and marg scenery, we arrived at Nuremberg after a run of fifty miles.

We put up at a popular hotel. The food was excellent. The visitors were numerous, mixed and entertaining. They included thirty school mistresses who took their holiday in a serious and laborious manner. They hailed from the U.S.A.

Another party was headed by a Captain Pflugge, whose visiting card announced that he belonged to the Royal Air Force.

This party travelled in a huge American automobile which was stacked with luggage and fitted with a powerful wireless receiving set. The car looked like a Thames barge on wheels.

It is doubtful if the intrusion of 2 L O and "Uncle Rex" into a Bavarian glen would add an appropriate or desirable element to the amenities of the place.

The coupé had difficulty in approaching the hotel entrance, for a dense crowd blocked the street. Trams and 'buses were held up, traffic control had ceased and the efforts of the numerous policemen to move the people on were of no avail.

A high functionary in a state of distress shouted, gesticulated and implored Captain Pflugge, R.A.F., to go away and to take his musical caravan with him.

The gallant captain, all smiles and good humour, did not see why music-loving Germany should be deprived of the rare and refreshing fruit which his valves were plucking from God's free air.

However, after a really touching effort by the high functionary, the music factory played herself out of the crowd to the strains of the "Pilgrims' March."

Fritz cheered.

Captain Pflugge bowed his acknowledgments.

The policemen removed their helmets and mopped their brows.

The German municipal police are a good-natured, polite set of men. They are always clean, well-clothed and smart in a soldierly way ; but then, they are military, rather than civic, guards. Their uniforms, and especially their head-dresses, are fashioned on the lines of those of the pre-war army. Thus, should you miss the boundary posts, you can tell whether you are in Württemberg, Bavaria or Baden by noting the distinctive police uniforms in the first towns through which you may pass.

(To be continued).

Reviews.

MEDICINE AND THE MAN. By Millais Culpin, M.D., F.R.C.P. London : Kegan Paul, Trench, Trübner, and Co., Ltd. 1927. Pp. 67. Price 2s. 6d.

This is another little volume of the *Psyche Miniature Series*. The author in his first chapter elaborates on the belief that with the diagnosis of a neurosis or functional nervous disorder a physician's professional interest ends. The second chapter is an attempt to define a "neurosis," the word is applied in a haphazard fashion to mental and physical conditions, in current usage the sufferer from a neurosis is not insane, yet there is a subtle condemnation involved in the word and, as the author says, to call a person neurotic is almost libellous.

Chapter III is headed, "What is behind the neurosis?"

The author believes that the term neurosis should cover the disturbances which can be described in the term of physiology—even this definition covers a mass of symptoms which really belong to the minor psychoses. He states that, apart from lunacy, disturbances of thoughts, emotions and desires are subjects avoided by medicine and believes that if the reader will understand that the mental processes which produce some disorders of behaviour are unknown to the patient he will have a greater insight into these cases. Neurosis can be described as physical manifestation due to an

unsuspected emotional state. The physical state is the neurosis but the symptoms are determined by the emotional state. The importance of D.A.H. as a symptom of a neurosis is rightly stressed in this chapter. In Chapter IV the author considers how the public are concerned. This chapter is amusing, but very true. As the author says, "To be highly strung is commendable, nervous exhaustion calls for sympathy and neurasthenia is respectable though flyblown; but to have a neurosis is dubious, to be neurotic is shameful and hysteria is moral delinquency." And again, "The public, through its habit of using for similar conditions words charged with varying moral judgment, has no suspicion that the nervous breakdown of a statesman, the neurasthenia of a business man or the claimant for compensation, the neurosis of an unhappy wife, the disabling symptoms of a neurasthenic pensioner or a miner with (or without) nystagmus, are all alike in being failures of adjustment of the individual to his surroundings"

The author ends his book with a chapter on "Some Conclusions." The book is very readable and should be of great value to its readers in helping them to understand the failure of medicine to deal with patients suffering from a neurosis. Again to quote the author, "Above all, let him (the reader) recognize that a neurotic patient must be accepted as a responsibility of medicine or frankly handed over to the chiropractor or the Christian Scientist."

W. L. W.

EMERGENCY SURGERY. By G. De Tarnowsky. New York and Philadelphia. 1927. Pp. xvi + 718. Price \$7.50.

The title of this book is at first sight somewhat misleading. By "Emergency Surgery" most medical men would visualize the "Acute Abdomen," etc., yet here we find one of the best books on war surgery that has come to print. The author has obviously had considerable experience both in the operating zone in the Great War and also in civil practice. He quotes from reports published by many eminent British surgeons as well as from the fund of literature accumulated by the medical and surgical reports of the American Expeditionary Force.

A point apt to be forgotten, but very ably enunciated by the author, is the fact that the treatment of war injuries is very much the same as that of the everyday accident in civil life. After all, where is the mechanical difference between an injury caused by a missile fired from an enemy's gun and that caused by the trauma from any accident in a railway or ship-building works? In both cases the treatment is similar.

The book is well illustrated and the arrangement of the various chapters under the different classes of injuries is admirably carried out.

The author (on p. 67) is apt to query the use of the Thomas' splint as a first-aid measure, because it takes up too much time for its proper adjustment and requires too exact a technique. Yet in the Great War the

Thomas' splint was the one splint *par excellence* for use in the forward area, and with very little teaching could be most rapidly and efficiently applied by the regimental stretcher bearers.

The author lays stress on the necessity for the early *débridement* or excision of all devitalized tissue, and if possible an immediate primary suture of the wound; one saw during the war what a saving of time this meant to the convalescence of the patient. This is of even greater importance to the industrial worker, both from his own and his employer's point of view.

The use of ether in the treatment of wounds is described and has been strongly advocated by many surgeons for irrigations of septic joints and the peritoneum.

Blood transfusion by both the citrate method and the Percy method is described.

The chapter on "Classification of Head Injuries" is exceptionally good. The method of closing large areas of bare skull left after free excision of scalp wounds by suitable gliding flaps is well depicted.

Chapter XIV deals with wounds of the thorax. No greater advance has been made in surgery than in dealing with penetrating wounds of the chest. Prior to the Great War intrathoracic surgery was seldom undertaken without the aid of much complicated apparatus. Now that a comparatively new operative field has been opened up it is quite possible to treat a wound of the thoracic cavity in the same way that injuries to the abdominal viscera are treated.

Chapter XI deals with abdominal wounds. Here again is shown the great advance in the operative technique for what was formerly looked upon as a fatal wound. We see how, early in the war, the French were still averse to surgical interference and how, by the end of the war, operation for penetrating wounds of the abdomen was recognized as the only hope of saving the patient's life. Over a series of many thousands of abdominal operations, the gratifying result of fifty per cent of recoveries was obtained. The one constant factor affecting after results was the time which elapsed between the receipt of the wound and the arrival of the patient at the operating table.

In Chapter XVIII, devoted to wounds of the peripheral nerves, there is a full description of the various operations performed, and also details of the effects of total or partial severance of the individual nerves and, more important still, the prognosis as to recovery.

Chapter XXVI is interesting as showing the medico-legal aspects and liabilities under the Workmen's Compensation Scheme in America, but cannot be taken as anything more than a rough guide, our own laws being somewhat different.

To sum up this is a most delightful book, full of up-to-date treatment of wounds, which might well be on the bookshelves of all casualty surgeons and army surgeons of all nationalities.

G. G. T.

PRACTICAL BACTERIOLOGY, BLOOD WORK, AND ANIMAL PARASITOLOGY: Including Bacteriological Keys, Zoological Tables and Explanatory Clinical Notes. A COMPENDIUM FOR INTERNISTS. By E. R. Stitt, M.D., LL.D., Rear-Admiral, Medical Corps, and Surgeon General U.S. Navy. Eighth Edition, revised and enlarged, with 1 plate and 211 other illustrations, containing 683 figures. London: H. K. Lewis and Co., Ltd. 1927. Pp. xv + 837. Price 24s.

First published in the year 1909, this book has now reached its eighth edition, and has evidently supplied a genuine want. It is, in our opinion, still justifiably popular, though it can hardly now be called either a small book or very portable; in fact, as the author himself admits, it is no longer a pocket manual. Though originally prepared to serve as a textbook in clinical pathology for the student officers of the Naval Medical School, U.S. Navy, this book is now styled "A Compendium for Internists"; it costs four times its original modest price; its bulk and its weight are more than twice what they originally were; in fact, it is keeping pace with modern American Naval developments. The book is copiously illustrated with figures of somewhat unequal merit, some of which we think, might with advantage be omitted in future editions; for instance, fig. 162 gives but a poor impression of *Glossina palpalis* compared to fig. 163 which immediately faces it. We find little to criticize in the additional matter which this new edition contains; it is in our opinion all good. The Kahn test is thoroughly explained. Chapter XXVIII on the diagnosis of infections of the teeth is new and valuable. Chapters XIII and XIV on the study of the blood is thoroughly up-to-date. The book remains a mine of information and can be thoroughly recommended to officers of the Royal Army Medical Corps.

A. C. H. G



Correspondence.

LIAISON.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—I should like, in the first place, to express my appreciation of Colonel Sandiland's reply to my letter on "Liaison."

Expressed purposely in a somewhat provocative manner, the object of my letter was to arouse interest in this important matter and to obtain the views and experiences of others—especially of some of our "opposite numbers," who, being interested in the medical service, might see fit to give their opinions from another standpoint. That Colonel Sandiland's experiences were comparatively favourable must be a source of gratification. The excellent work performed by our Service during the early phases of the war is well known. I am afraid that my thoughts, when indicating the period 1914, were centred on what one has heard of field ambulances which arrived too late for an action, of others who, "dumped in the blue," guided themselves into position directed solely by the sound of firing, etc.

That such things are bound to happen under exceptionally trying circumstances is realized, but if liaison had been good and "automatic" they might not have occurred.

It is comforting to know that in Colonel Sandiland's personal experience liaison must have been good in places. The experience of others has not been so fortunate. My own experiences later in the war and afterwards, have not been so fortunate—*ex oriente semper aliquid!*—nor has that of many others, and one submits again that, as a rule, sufficient attention is not given to the subject of liaison, at any rate in so far as it affects the instruction of the more junior officers who are often called upon to perform staff duties in peace and war—nor is its practice exercised to a sufficient extent in peace time. Continual practice makes a matter automatic. One wishes to avoid at all costs anything which might be construed as recrimination, but there is no doubt that much unnecessary trouble and risk of "incidents" would be avoided if junior officers knew more about the medical service, and particularly how dependent it is in the field on exact information.

Numerous incidents occur to one, of units not knowing where the A.D.S. is placed although its location was notified to brigade and the message acknowledged—of march tables made out without reference to "M" putting all medical units at the rear of a division, no medical provision being made for advanced guards or airplane casualties—of empty lorries lying for days outside overcrowded C.C.S.'s when a partly empty hospital was within a few hours' run and many hundred cases fit for evacuation—bad liaison!

But why prolong the list—*humanum est errare*! It is hoped that by ventilating the subject these lapses will be minimized in future.

There is no doubt that turning T. Atkins into a sham casualty is an expensive proposition, but medical units also require training and their chief difficulty, apart from liaison, is the handling of numbers of casualties—they would, however, be perfectly satisfied with a modest five per cent.

Even if this could not be attempted it would be possible to state sites of medical posts (imaginary if necessary) in all orders and notify all changes by messages, etc. This would get staffs used to handling the question, even when dealing with actual troops; they will have to do both on service, so why not practise it?

In a staff ride of course the matter is simpler, as there are fewer other details to remember.

If this liaison is not practised in peace time it is liable to be overlooked in the stress of war, at any rate in the opening engagements.

In this connexion I would like to urge another point, though I know that there are powerful reasons against it, and that is that medical units should invariably be informed of the frontage covered by the troops and the position of brigade headquarters. It would make the job of a field ambulance commander much simpler, especially if his ambulance is coming up from the rear and is not as yet in touch. Brigade headquarters would of course be able to inform him of the position of the R.A.P.'s, as they would be notified by messages from battalion commanders.

Information to be of use to a field ambulance commander must, as a rule, come from in front, and he should be able to get all necessary information as soon as he gets into touch with brigade headquarters. Information from the rear is often out of date by the time it is received.

Another point that has always mystified some of us is why, when close liaison with G is so essential to an A.D.M.S. during an action, is he generally put with the A branch and usually with the 2nd echelon of divisional headquarters? There is a tendency still to regard an A.D.M.S. as a purely administrative officer, and the fact that he commands three field ambulances and a sanitary section is sometimes forgotten. I was told once by a G.S.O.1. that he "could not understand why an A.D.M.S. was usually a substantive colonel," and my reply that he commanded three units, each in turn commanded by a lieutenant-colonel, seemed to surprise him. Let us hope that in the near future an A.D.M.S. will have his own headquarters and his own staff, as is the case with the C.R.A. who occupies a somewhat analogous position. Let it be in close liaison with A by all means, but also with G when trouble is in the wind!

With apologies for taking up so much of your valuable space.

Invereruan,

South Farnborough, Hants.

March 31, 1928.

I am, etc.,

KEPPEL H. REED.

Lieutenant-Colonel, R.A.M.C.

Notices.

NEW USE FOR EPHEDRINE.

It is of interest to note that a new use has been found for ephedrine. Dr. E. Muir (*Indian Medical Gazette*, April 28, 1928, p. 198), in a preliminary note on the use of ephedrine in leprosy, reports that following a discovery that adrenalin remarkably relieves, in a large proportion of cases, the nerve pains among leprosy patients, it was decided to try ephedrine, which has an action similar in many respects to that of adrenalin. It was found that ephedrine was more efficient and lasting in its action, having besides the additional advantage that it can be taken by the mouth, whereas adrenalin, to have any effect, must be injected. Ephedrine obtained its present reputation in the treatment of asthma and hay fever from the use of the optically active lævo-rotatory alkaloid. The synthetic product is optically inactive. It is most important, therefore, to adhere to the use of the natural alkaloid derived from genuine ephedra (Ma Huang) imported from China. Ephedrine hydrochloride, which is prepared at the "Wellcome" Chemical Works, Dartford, England, where elaborate precautions are taken to eliminate pseudo-ephedrine and other subsidiary alkaloids, is obtainable from Burroughs Wellcome and Co., as "Tabloid" Ephedrine, $\frac{1}{2}$ gr. and 0.03 gramme, the metric strength having recently been added to the list.

INDEX TO VOLUME L.

C.N. = Clinical and other Notes.
C.L. = Current Literature.

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